

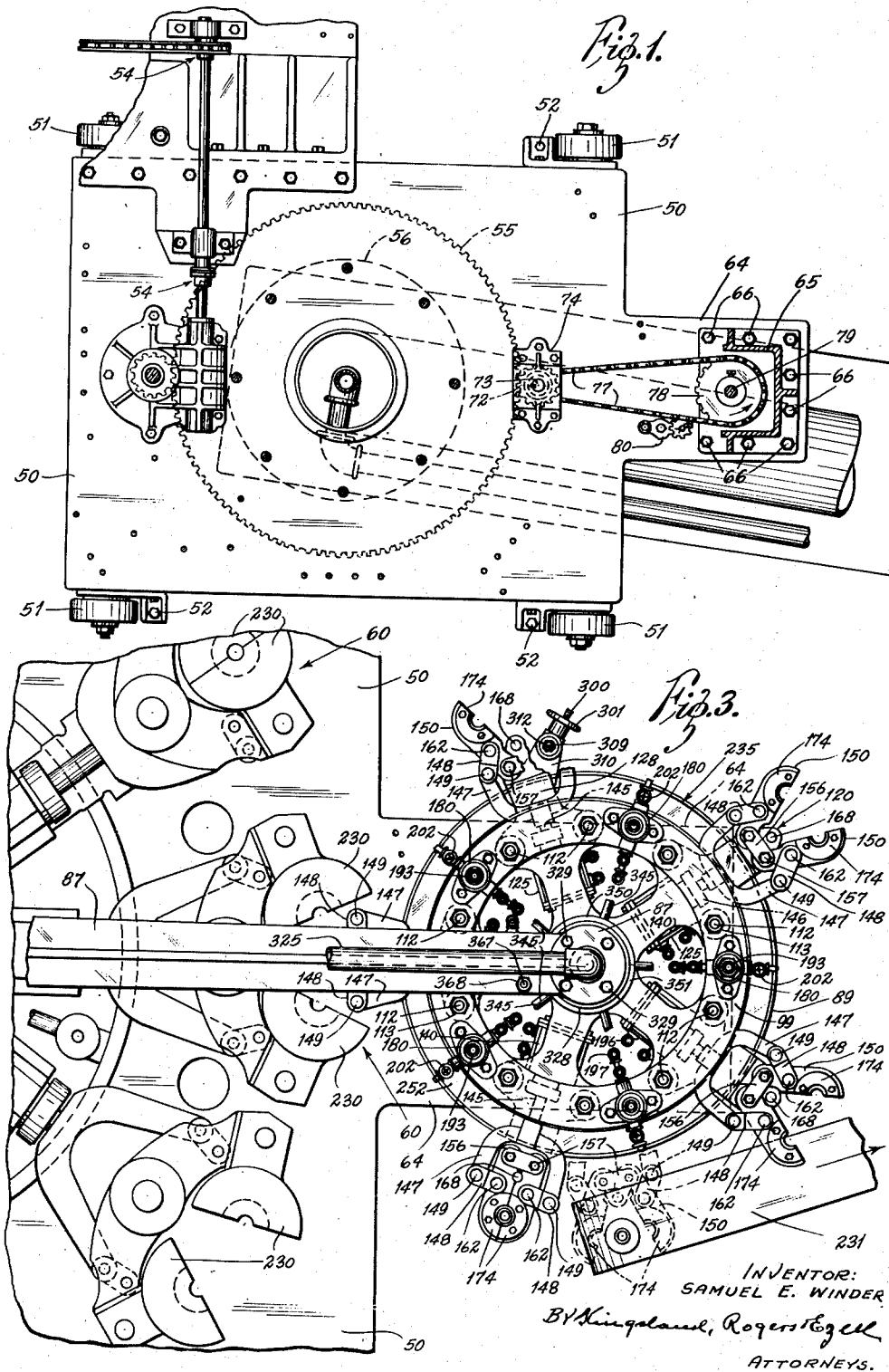
Sept. 9, 1952

S. E. WINDER
TAKE-OUT MECHANISM

2,609,943

Filed Sept. 28, 1946

8 Sheets-Sheet 1



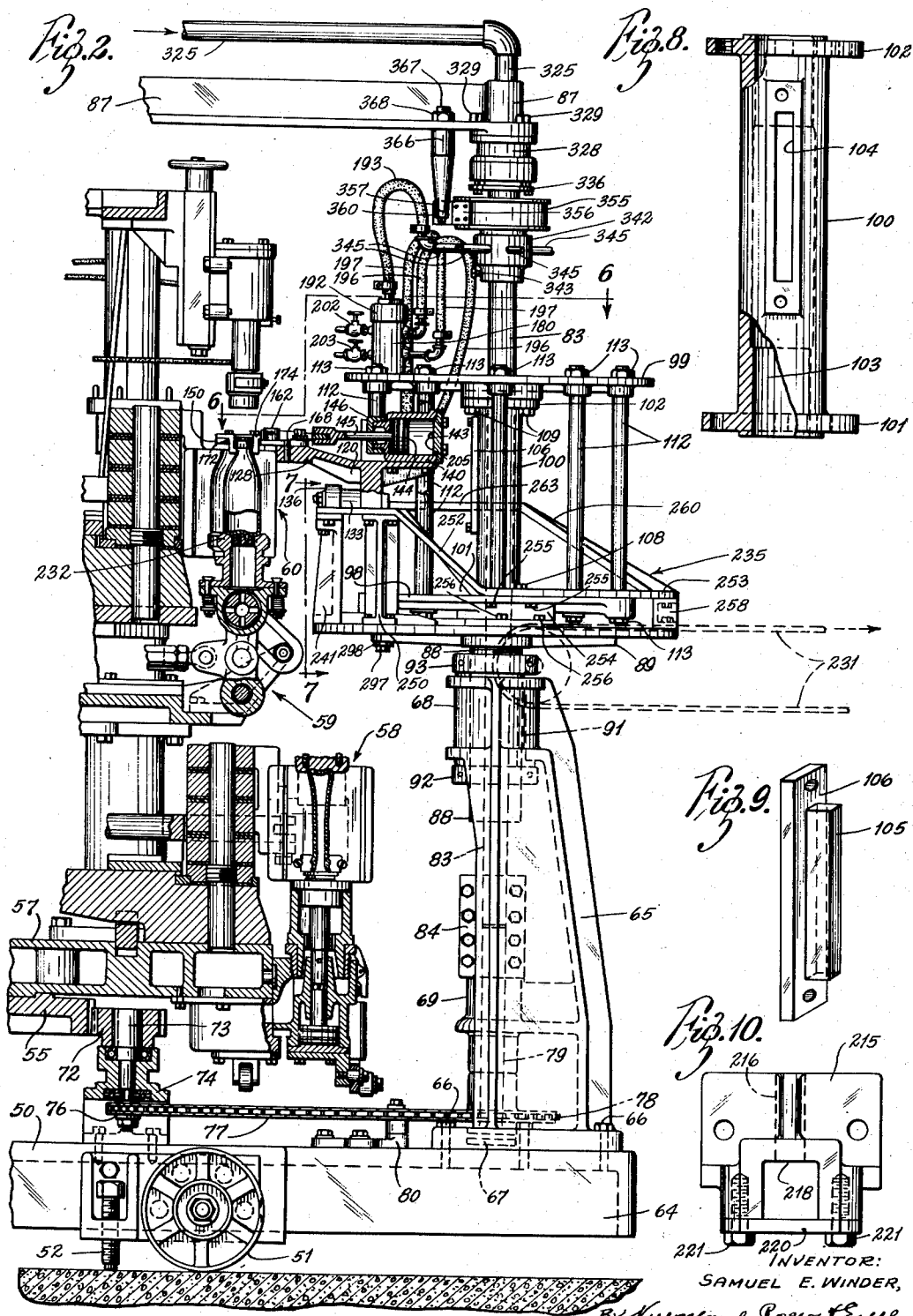
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8 Sheets-Sheet 2



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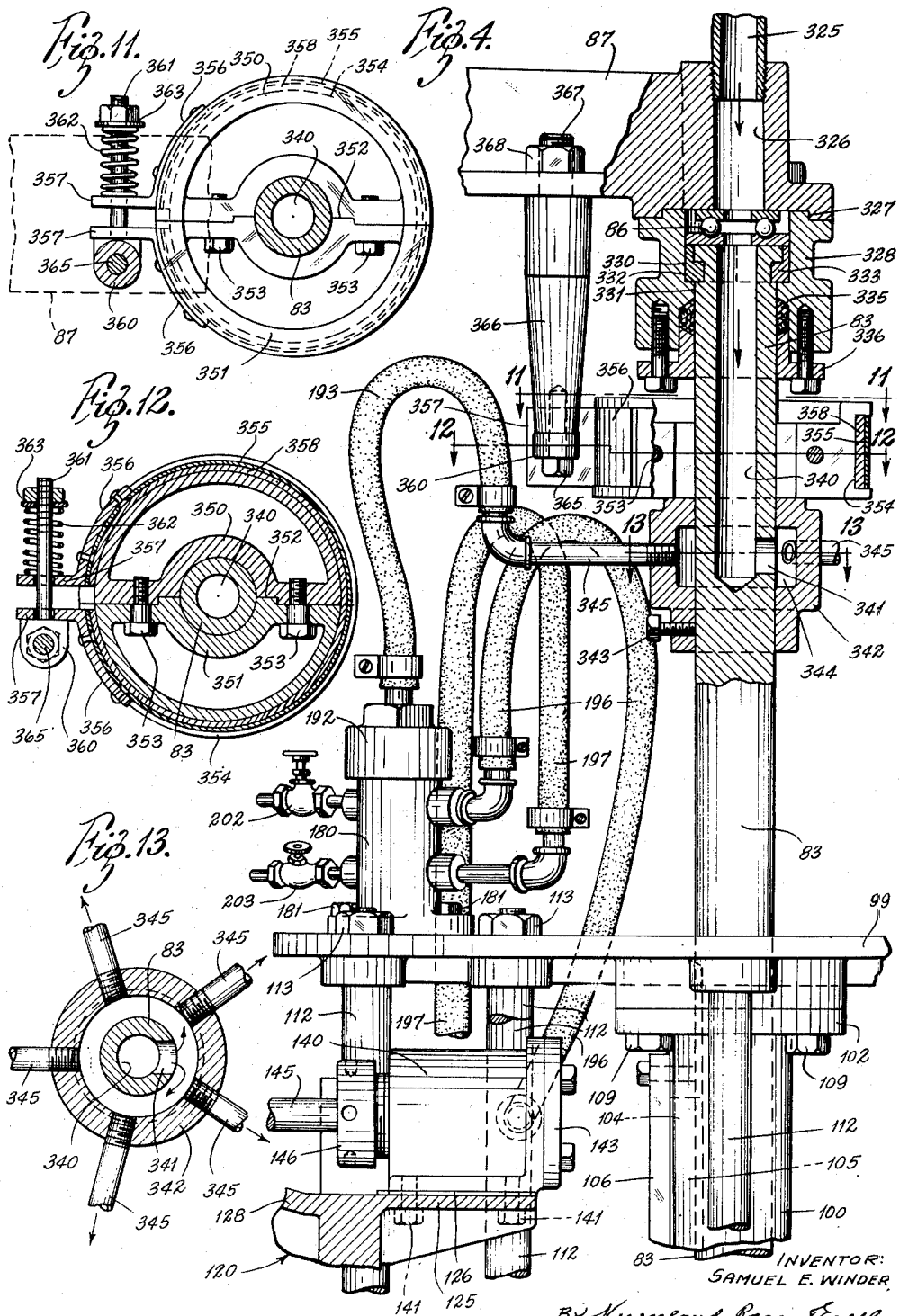
S. E. WINDER

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TAKE-OUT MECHANISM

Filed Sept. 28, 1946

8 Sheets-Sheet 3



S. E. WINDER
TAKE-OUT MECHANISM

8 Sheets-Sheet 4

Fig. 1. Fig. 2. Fig. 3. Fig. 4. Fig. 5. Fig. 6. Fig. 7. Fig. 8. Fig. 9. Fig. 10. Fig. 11. Fig. 12. Fig. 13. Fig. 14. Fig. 15. Fig. 16. Fig. 17. Fig. 18.

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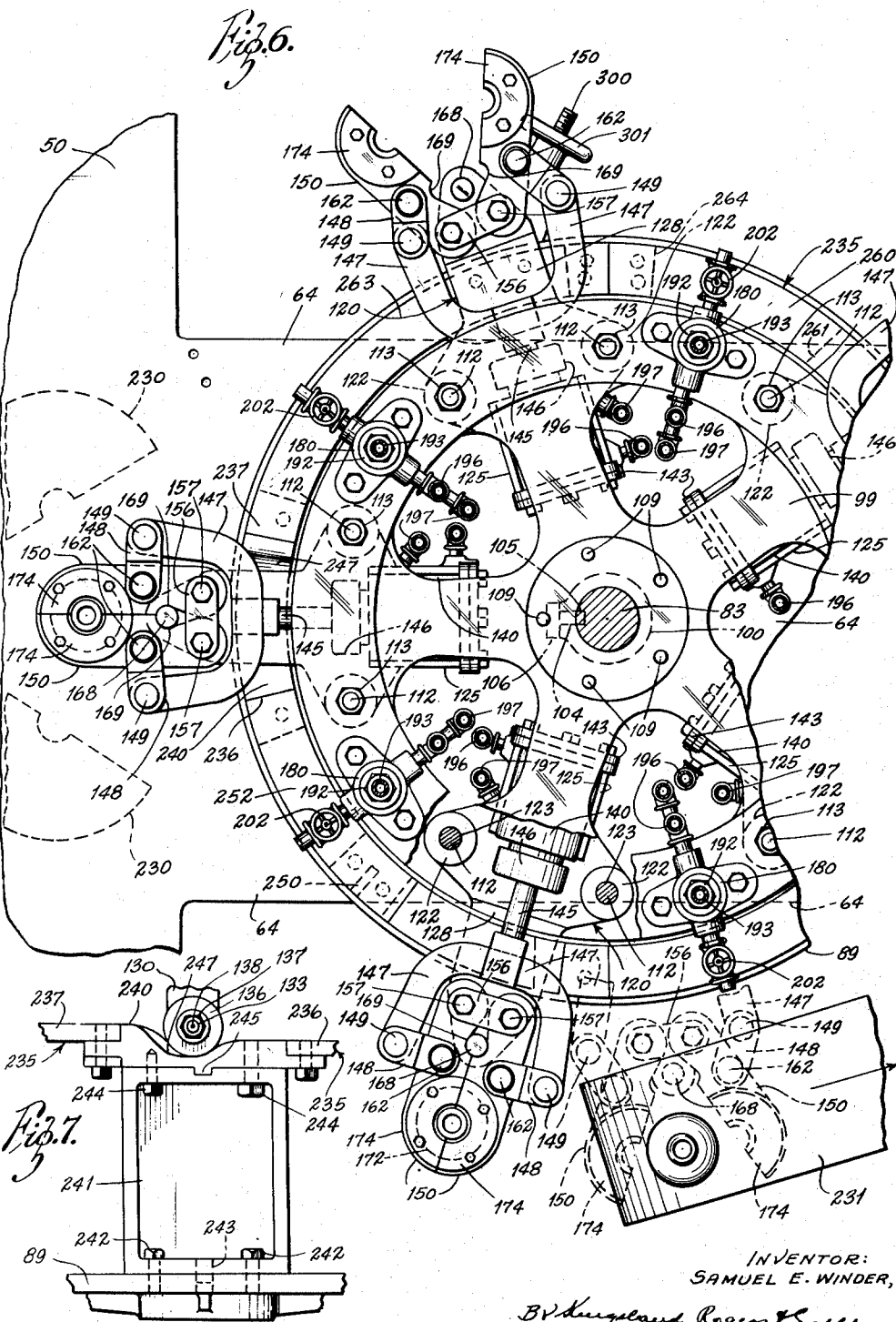
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8 Sheets-Sheet 5



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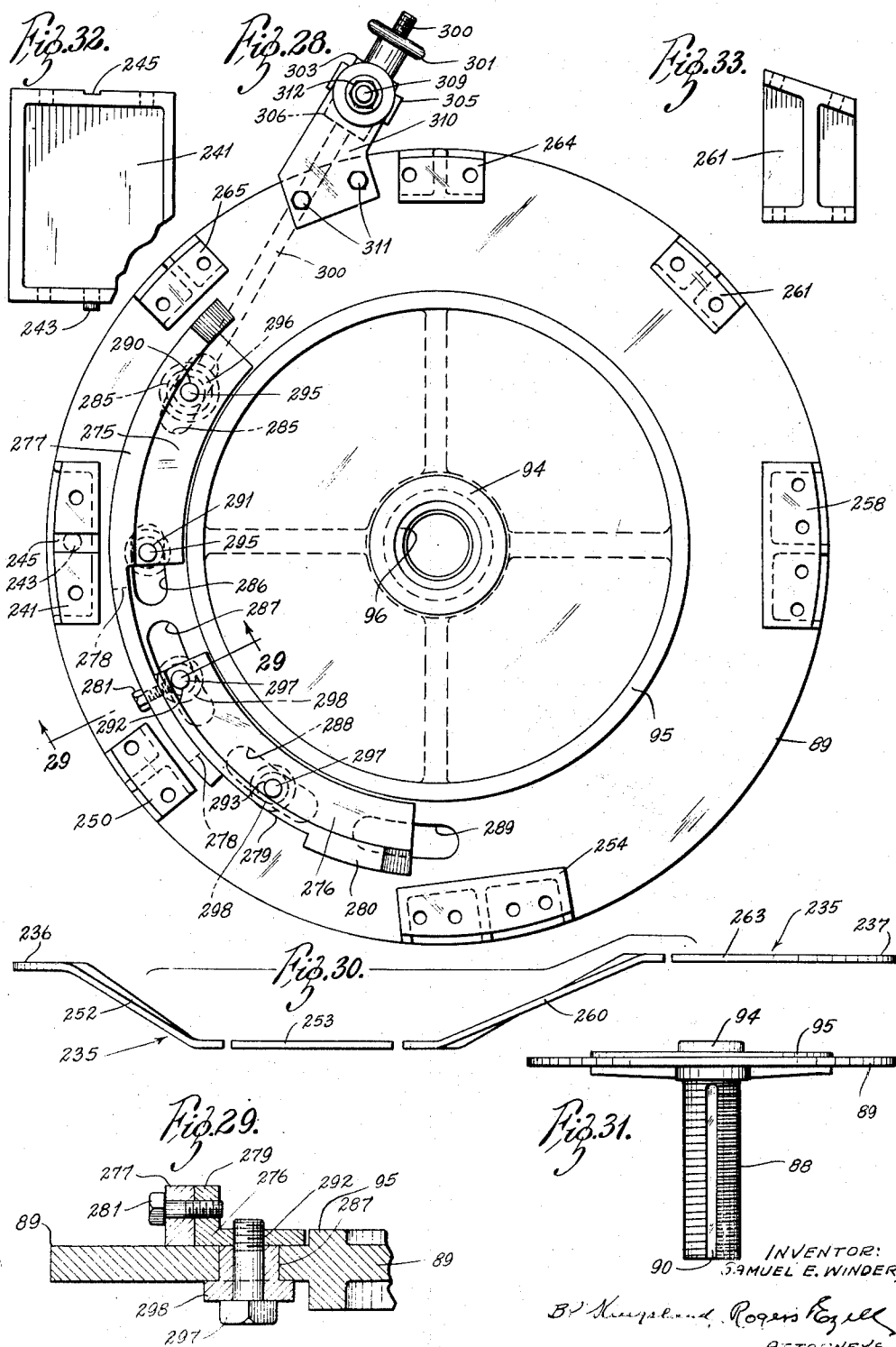
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8 Sheets-Sheet 7



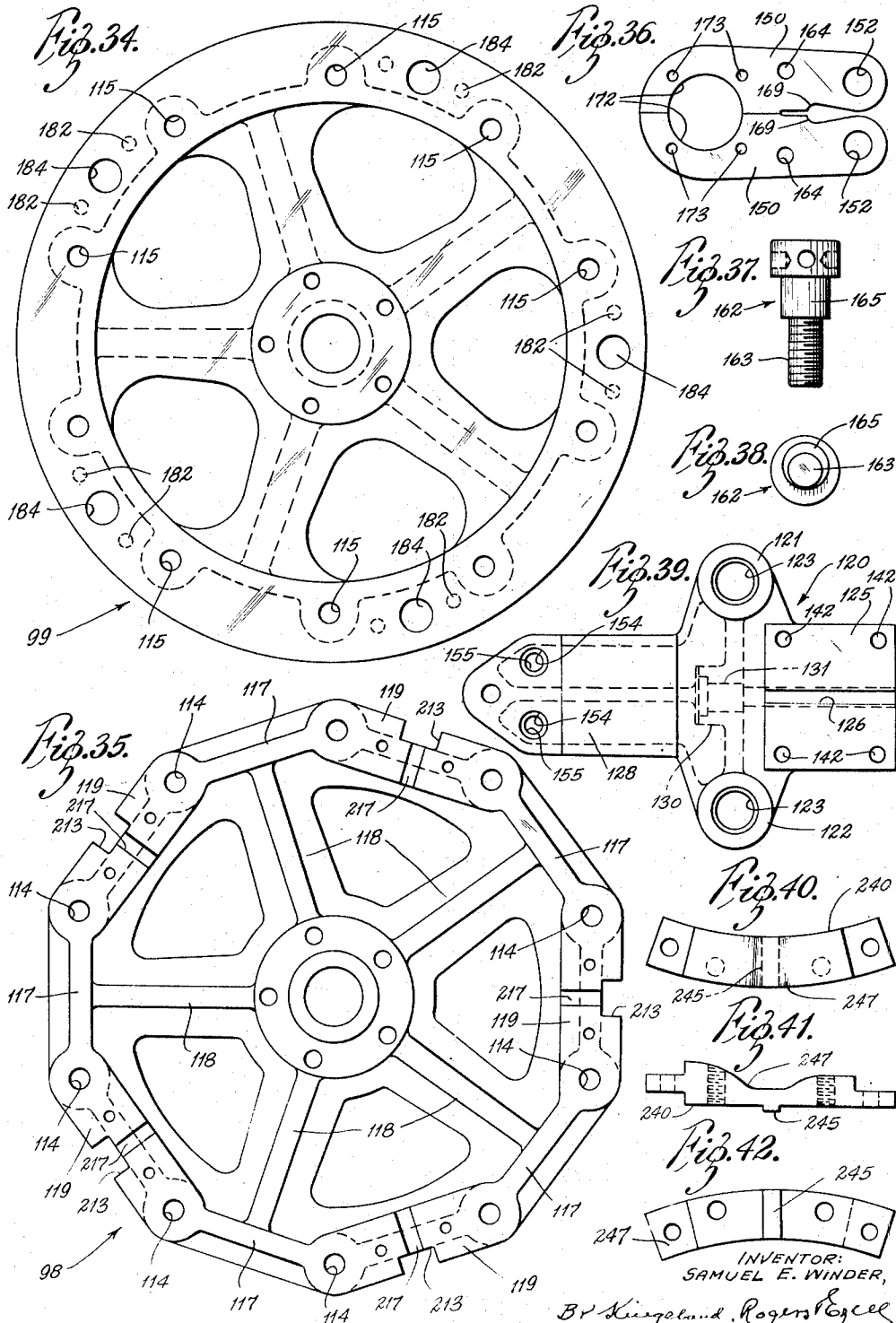
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S. E. WINDER
TAKE-OUT MECHANISM

2,609,943

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8 Sheets-Sheet 8



UNITED STATES PATENT OFFICE

2,609,943

TAKE-OUT MECHANISM

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Application September 28, 1946, Serial No. 700,012

14 Claims. (Cl. 214—1)

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The present invention relates to a take-out mechanism. More particularly, it relates to a take-out mechanism having particular use in removing finished ware from glass making machines, and transferring the same to some suitable point, such as to a conveyor means by which it may be conducted to a Lehr.

It is an object of the invention to provide a take-out mechanism that is fast in operation so as to take out a large number of items of ware per minute. A further object of the invention is to provide such a take-out mechanism as will have a plurality of independently operated take-out devices mounted on a common supporting member. A particular object is to provide a take-out mechanism having a plurality of take-out elements mounted on a common supporting member, so that, while one arm is performing one part of the take-out operation, another arm may be performing another part of the operation, or may be reestablishing itself for a subsequent take-out operation.

A further object is to provide a take-out mechanism of the foregoing kind in which the ware is moved from one level to another level. A further object is to provide a take-out mechanism which is adjustable in its level of operation, so that it may be properly coordinated with the glass forming machine. A particular object is to provide a mechanism of this kind wherein there are a plurality of take-out elements mounted on a common support, with the support vertically adjustable for a proper coordination of all of the arms with the glass forming machine.

A further object of the invention is to provide a take-out mechanism of this character in which the speed of functioning of ware engaging elements may be readily adjusted and may be adjusted during operation of the machine.

A further object of the invention is to provide a take-out mechanism of this kind wherein there are a maximum of interchangeable parts, and wherein the assembly of the parts is facilitated to a maximum degree by having interfittings that may quickly locate individual elements for proper operating positioning thereof.

A further object of the invention is to provide a take-out mechanism comprising a single support and means rotated thereabout for holding a plurality of take-out elements, which elements may be independently operated and successively brought into operative relationship with the glass forming machine. A further object is to provide, in the foregoing type of mechanism, speed con-

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trolling means adjustably to limit the free movement of the rotating elements.

Other objects will appear from the description to follow.

In the drawings:

Fig. 1 is a plan view partly in section of the base upon which a glass forming machine and the mechanism of the present invention may be mounted, showing the driving means for the machine and the present invention;

Fig. 2 is a side elevation partly in section of the take-out mechanism associated with adjacent parts of the forming machine, with one of its take-out cylinders and one of its valves mounted thereon, the others having been removed for clarity;

Fig. 3 is a plan view of the mechanism shown in Fig. 2 with the various take-out elements shown thereon, but with the air lines only fragmentally shown;

Fig. 4 is a view of the upper portion of the take-out mechanism appearing in Fig. 2, shown partly in section;

Fig. 5 is a view of the middle part of the take-out mechanism substantially as it appears in Fig. 2, but with the valve shown in partial section;

Fig. 6 is a horizontal section taken substantially on the line 6—6 of Fig. 2, but with additional take-out elements in place;

Fig. 7 is a view of part of the cam mechanism for changing elevation of the take-out elements and appearing on the vertical line 7—7 at the left middle of Fig. 2;

Fig. 8 (Sheet 2) is a side elevation of the hollow central column of the rotating member partly broken away;

Fig. 9 is a perspective view of the removable key for the hollow column of Fig. 8;

Fig. 10 is a plan view of one of the valve rod guide brackets;

Fig. 11 (Sheet 3) is a plan view of the brake mechanism, taken on the line 11—11 across the upper part of Fig. 4;

Fig. 12 is a similar view, taken as a horizontal section on the line 12—12 of Fig. 4;

Fig. 13 is a horizontal section through the air distributing chamber, taken on the line 13—13 horizontally across the middle of Fig. 4;

Fig. 14 (Sheet 4) is a plan view of one of the valve housings;

Fig. 15 is a vertical section through a valve housing, taken on the line 15—15 of Fig. 14;

Fig. 16 is an elevation, partly in diametrical section, of one of the valve pistons;

Fig. 17 is a diametrical section along the axis of one of the operating cylinders;

Fig. 18 is an elevation, partly broken away, of one of the links for use in closing the ware gripping elements;

Fig. 19 (Sheet 6) is an elevation, looking radially inward toward one of the valve mechanisms, taken approximately from the upper left corner of Fig. 6, a cam track supporting element being omitted for clarity;

Fig. 20 is a vertical medial section on the line 20—20 at the lower part of Fig. 19;

Fig. 21 is a vertical section through a portion of the cam adjusting means, taken on the line 21—21 of Figs. 19 and 22;

Fig. 22 is a horizontal section through the same mechanism, taken on the line 22—22 of Fig. 19;

Fig. 23 is a horizontal section through the elevating cam roller mechanism, taken on the line 23—23 just below the middle of Fig. 5 (Sheet 4);

Fig. 24 is a plan view, partly broken away, of a part of the valve operating cam;

Fig. 25 is an elevation thereof, taken from the bottom of Fig. 24;

Fig. 26 is a plan view, partly broken away, of another part of the cam shown in Fig. 24;

Fig. 27 is an elevational view, partly broken away, of this same portion taken from the bottom of Fig. 26;

Fig. 28 (Sheet 7) is a plan view of the adjustable support with certain cam elements thereto attached;

Fig. 29 is a section through the valve operating cam, taken on the line 29—29 of Fig. 28;

Fig. 30 is a development of the main elevating cam ring of the mechanism;

Fig. 31 is a side elevation of the adjustable bed, shown in Fig. 28;

Fig. 32 is a side elevation of one of the cam supporting elements for holding the elevating cam;

Fig. 33 is a side elevation of another of the cam supporting elements;

Fig. 34 (Sheet 8) is a plan view of the upper ring or table of the rotary support;

Fig. 35 is a plan view of the lower ring or table of this support;

Fig. 36 is a plan view of the take-out jaw carriers;

Fig. 37 is a side elevation of an eccentric stud for adjusting a jaw;

Fig. 38 is a bottom view of the said stud;

Fig. 39 is a plan view of a supporting bracket for the take-out elements;

Fig. 40 is a plan view of the starting cam, which appears in Fig. 7;

Fig. 41 is a side elevation of the cam of Fig. 40; and

Fig. 42 is a bottom view of the cam of Fig. 40.

As shown in Fig. 1, the mechanism may be mounted on a base 50 that is provided with wheels 51, so that it may be moved around, and jackscrews 52, so that it may be supported in any desired location. This base is one that is used in connection with a bottle forming machine, Serial No. 688,470, filed August 5, 1946, by this inventor, although it will be understood that the take-out or ware moving mechanism may be used to advantage with other glass forming machines and the like.

The glass forming machine outlined consists of a rotating table that has mounted thereon a plurality of molds which go through certain stages of processing glass into ultimate glassware,

with the result of producing completed bottles at a particular point in the rotation.

This machine, in general, includes a drive mechanism, generally designated at 54, which drive mechanism operates a larger gear 55 rotatably supported upon the table 50. The machine, as set forth in the application previously mentioned, has a central column, indicated generally at 56, about which this gear 55 is caused to rotate. The gear 55 is connected with a rotating table 57 that supports parison mold elements 58, in which parisons are formed during the rotation of the table. When the parisons are completed, they are transferred by transfer mechanisms, fragmentally indicated at 59, to finish mold sets, generally indicated at 60. The finish molds are caused to open, as indicated in Figs. 3 and 6, when they are brought to the three-o'clock position of Fig. 1. In this position, the completed glassware, here shown as a bottle, is resting upon a mold bottom plate, which in the present instance is indicated as a vacuum transfer head, described in greater detail in the co-pending application mentioned.

The base 50 has a projection 64 thereon that constitutes the principal support for the take-out mechanism of this application. This projection receives a standard of more or less channel shape, as shown at 65, which is held by suitable screws 66 to the projection 65 of the base 50. This column has a bearing 67 in its base, and, aligned with this bearing, it has a bushing 68 at its top. Between the bearing socket and the bushing, there is an intermediate bushing 69.

The big gear 55 meshes with a small gear 72, keyed to a shaft 73 that is supported in a bracket 74 attached to the base 50.

This bracket is formed to provide a space for the shaft to project downwardly but above the upper surface of the base 50. On this portion, the shaft 73 has a sprocket wheel 76 about which a sprocket chain 77 is mounted. This sprocket chain, in turn, passes around a sprocket wheel 78 journaled on a lower driving shaft section 79 that is supported in the bearing 67 and which also passes through the bushing 69. A suitable sprocket chain tightening device 80 is employed.

By the foregoing arrangement, the shaft 79 will be driven coordinately with the rotation of the glass forming machine table 57 and the various molds mounted thereon.

An upper shaft member 83 is attached to the driving shaft element 79 by a combination coupling and whip reducing device 84, which may consist of a pair of half-round collar elements bolted together around the ends of the two shaft members and frictionally bound to them. By this means, the shaft 83 is caused to rotate coordinately with the rotation of the forming machine table 57 when the bolts are tight; but relative adjustment between them may be made.

The shaft element 83 extends upwardly through the center of the bushing 68 and is rotatively supported at its top against a bearing 86 (Fig. 4). This bearing, in turn, supports one end of an arm 87 that extends across and is, in turn, supported upon the center column of the forming machine, as appears in the application referred to.

The bushing 68 receives a depending threaded cylindrical skirt 88 (Fig. 31) of a stationary support 89. This threaded portion 88 is in the form of a skirt so that it may be slipped down over the shaft 83 and passed through the bushing 68. It may be internally bushed to aid sta-

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bilization of the shaft 83. It has a keyway 90, into which a key 91 fits to hold the support 89 non-rotatably in the standard 65.

There are two collars 92 and 93 above and below the bushing 68, which collars are threaded around the skirt portion 88 and may be turned to alter elevation of the support 89, and then tightened against the opposite ends of the bushing.

The support 89 has an upstanding central hub 94 (Figs. 28, 31) and an annular flange 95 out from the hub 94. The hub 94 has a recess 96 therein that may receive a thrust bearing.

There is a rotatable support for a plurality of take-out devices in the form of a framework. This framework includes a lower ring or table 97 and an upper ring or table 99, these being joined and held in spaced relation by a central column 100. This column is shown more clearly in Fig. 8. It has a lower flange 101 and an upper flange 102. Below the lower flange, there is a rabbet that is adapted to interengage with the groove 96 of the stationary support 89 and to rest upon a thrust bearing therein. A similar rabbet projects from the upper end of the flange 102 for purposes to appear.

The column 100 has a passage 103 there-through so that it may be fitted over the shaft 83. Preferably, the opening 103 is enlarged between its ends, so as to provide a limited bearing area adjacent the ends of the column 100.

The column has a long slot 104 that passes through the wall of the column 100 and a flat boss projecting therearound. A key 105, formed with a backing plate 106, is shown in Fig. 9. The key passes through the slot 104 and the plate engages against the flat projection and may be attached thereonto by screws, as is shown. The shaft 83 has an elongated keyway therein which is engaged by the key 105, so that the column and the parts secured to it are caused to rotate with the shaft (note the dotted line outlines at the center of Fig. 6). The elongated keyway permits vertical adjustment of the framework.

The lower plate 98 is attached below the lower flange 101 of the column 100 by screws 108. The upper plate 99 is similarly attached above the upper flange 102 by screws 109. A series of guide bars 112 extend between the lower and upper plates 98 and 99 and are arranged in pairs around the peripheries thereof. These guide bars, as shown in Fig. 19 (Sheet 6) for example, have reduced ends that pass through the lower and upper plates 98 and 99 and receive nuts 113 for attaching the parts together. As shown in Figs. 34 and 35 (Sheet 8), the lower table 98 has openings 114 around its periphery to receive the rods 112, and the upper table 99 has corresponding openings 115. These guide bars cooperate in making a rigid supporting structure out of this rotating framework.

Fig. 35 shows that the lower table 98 is tensided, with bosses adjacent the openings 114. Alternate spaces between the bosses are connected by upstanding web portions 117 which are joined by radial web portions 118 that extend along the spokes into the hub of the member. The intervening spaces are provided with webs having upper flanges 119 that are flush with the tops of the bosses.

Each pair of guide rods 112 flanking a web 117 receives a pick-up supporting bracket 120, shown detached in Fig. 39 (Sheet 8). The upper table 99 is broken away at approximately the seven-o'clock position in Fig. 6, so as to show the support of this bracket 120 between adjacent guide

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rods 112. As shown, there are five such brackets around the rotary framework.

Each bracket 120 has two laterally extending wings 121 and 122 (Figs. 6, Sheet 5, and 39, Sheet 8) that have openings 123 therein to engage over the pair of guide rods mentioned and to slide freely thereon. Suitable bushings may be used as desired within the openings 123.

Each bracket 120 has a rearwardly extending projection 125 having a plate-like surface thereon, this projection being adapted to receive an actuating cylinder. A longitudinal groove 126 is accurately disposed in this portion. There is, on the bracket 120, a forwardly and upwardly extending projection 128 that receives the ware holding mechanism of the take-out device.

The bracket 120, as clearly appears in Fig. 5 (Sheet 4), has a transverse depending wall 130 to which an actuating cam device is attached. As appears also in Fig. 23 (Sheet 6), the depending wall 130 is provided with an opening 131 therethrough that has an enlargement 132 therein to provide a shoulder. A cam roller shaft 133, having several different diameters has one diameter that fits within the opening 131 and a larger diameter that fits within the opening 132. It likewise has a projecting threaded end to receive a securing nut 134, by means of which it is held to the wall 130. It will be seen that this gives rigidity to the connection between the bracket 120 and the shaft 133. At its outer end, the shaft 133 is reduced to receive a cam roller 136. Beyond this portion, the shaft 133 has a reduced threaded end that receives a washer and a nut 137. This arrangement provides for the free rotation of the roller 136 on the shaft without binding. A bore 138 may be provided, as shown in dotted lines in Fig. 23, for the introduction of oil to the bearing of the cam roller, which is shown as having a bushing therein.

As heretofore noted, the rearward extension 125 on each bracket 120 is adapted to support a power cylinder. Each power cylinder 140 (Sheet 4) has a flat bottom with a projecting tongue thereon that interfits closely with the groove 126 in the bracket. This affords accurate axial disposition of the cylinder. The cylinder is held to the bracket by machine screws 141 that engage in holes 142 in the rearwardly extending projection 125.

The cylinder has a removable cylinder head 143 closing its end. It is adapted to receive a piston 144 that is attached to a piston rod 145. This piston rod passes through a packing gland 146, such as that shown in Fig. 5, attached to the end of the cylinder 140. The piston rod 145 has a yoke 147 integrally formed with the outer end thereof. The two ends of the yoke 147 fit into slots formed between two arms of links 148, shown in Fig. 18 (Sheet 4) in side elevation and appearing also in Fig. 6 (Sheet 5). Yoke pins 149 pass through the two arms of the links 148 and the ends of the yoke 147, so that the two links are pivotally held onto the ends of the yoke. These yoke pins are removably held in place by cotter pins (not shown).

On each take-out or ware engaging device, the other ends of the links 148 overlie two take-out arms 150 (Figs. 6, Sheet 5, 36, Sheet 8). These two arms 150 are supported upon the outer end 128 of the bracket 120. As shown in Fig. 36, each arm has an opening 152 therethrough. Each hole 152 receives a bushing collar 153, the skirt of which enters a groove 154 cut around a threaded opening 155 in the end 128 of the bracket.

A tie link 156 extends between the ends of the take-out jaw carriers 150. A pair of screws 157 pass through the ends of the tie link and into the holes 155, clamping the bushing collars 153 securely in place against the end 128 of the bracket, but permitting proper pivotal movement of the two take-out jaw carriers.

The connection of the yoke links 148 to the take-out jaw carriers is accomplished by means of eccentric studs 162 that are shown in Figs. 5 and 6 and are shown separately in Figs. 37 and 38 (Sheet 8). Each of these studs has a reduced threaded portion 163 that passes through one of the openings 164 in the two jaw carriers 150, and receives an attachment nut on the bottom, as shown in dotted lines in Fig. 5. These eccentric studs have intermediate portions 165 that are shown in Fig. 38 to be eccentric of the threaded portion 163. These portions 165 are sized to fit accurately in the holes 164. The studs have heads on them designed to receive spanner wrenches. By this means, the studs may be passed through the jaw carriers and securely held thereon. At the same time, they pass through the links 148, which are thereby held pivotally connected to the jaw. When the nuts are loosened, the studs may be turned, and this will alter the distance between the adjacent parts of the carriers and the centers of the yoke pins 149. By this means, the two jaw carriers 150 may be individually given a fine adjustment, so that the two will be closed at the proper positions.

The upstanding portion 128 of each bracket 120 receives fixedly a pin 168 that fits accurately within complementary cut-outs 169 in the carrier arms 150, so as to limit their maximum inward movement in a closing direction and prevent their passing over center.

Each of the take-out jaw carriers has threaded openings 173 to which suitable plates 174 may be removably attached, these plates constituting the take-out jaws. They are sized and shaped to have the proper complementary recesses to engage the top of the ware at the finish thereof, and lift the same, supporting it by the finish. It will be observed that the jaw carriers themselves have large complementary recesses 172, so that they may accommodate the largest ware expected. Accommodation for different sized finishes is thereby made by merely changing the jaws 174.

From the foregoing, it will be seen that the reciprocation of a piston 144 in the cylinder 140 to its outermost position, shown in Fig. 5 and at the seven-o'clock position in Fig. 6, will close the two carriers 150 together by the action of the links. When the jaws are thus closed together, the links 148 are preferably aligned. When the piston is drawn inwardly toward the center of rotation of the rotating support, the yoke 146 will withdraw the yoke pins 149 and these will act through the links to open the carriers 150 to the positions shown at the eleven-o'clock position in Fig. 6.

The operation of the piston is accomplished by a valve mechanism. There is a valve for each of the cylinders, these valves being mounted above the top table 99 of the rotating framework and spaced around the periphery thereof alternately with the ware take-out devices. Each valve (Sheets 4 and 6) includes a valve housing 180 that is held by screws 181 to the top of the table 99. As shown in Fig. 34 (Sheet 8), there are suitable threaded holes 182 to receive the screws 181. Between each pair of adjacent holes 182, the table 99 has a hole 184.

As shown in Fig. 5, each valve housing 180 has a bore therethrough, in which the upper valve plug end of a plunger 188 operates. This upper end slides pistonwise within the housing. It has an axial bore 189 extending a limited distance down from the top, and which communicates with two radial ports 190 and 191. The housing 180 has a cap 192 threaded thereon. This cap receives a compressed air line 193. By this means, compressed air acts downwardly on the top of the plunger 188 and urges it to its lower position.

The housing 180 has outlet passages 194 and 195 extending therethrough and communicating with lines 196 and 197, respectively. It will be seen that, when the valve is in its upper position, shown in Fig. 5, the radial passage 190 establishes connection between the air line 193 and the pipe 196, whereas the other radial passage 191 is not connected to anything. The valve plunger 188 has an upper radial groove 198 and a lower radial groove 199. The housing has an upper exhaust passage 200 and a lower exhaust passage 201. These passages lead through valves 202 and 203, respectively, and thence to exhaust. It will be seen that, when the valve is in its upper position, the radial groove 199 is in registry with the passage 195 and connects the other line 197 to exhaust through the valve 203, while the line 196 is receiving pressure from the line 193. Under conditions to be described, the valve plunger 188 will be lowered to bring the radial passage 191 into registry with the casing passage 195. This will bring the peripheral groove 198 into registry with both the casing passage 195 and the exhaust passage 200. In this case, the conditions in the lines 196 and 197 will be reversed, air pressure being delivered from the line 193 to the line 197 and exhaust being established for the line 196 through the valve 202. Under these conditions, the piston will be reversed.

A comparison of Figs. 5 and 17 will show that the line 196 is connected into the back end of the cylinder 140, which is provided with a communicating passage 205 for that purpose. The line 197 communicates into the outer end of the piston through a passage 206.

Each valve plunger 188 extends downwardly through one of the openings 194 through the upper table 99, as shown in Figs. 19 and 20. Below the upper table 99, the valve plunger 188 is forked and is united to a rod 209 by a pin connection 210 that may readily be removed, it being secured by cotter pins, as shown in Fig. 19. This rod projects downwardly to adjacent the lower table 98.

The lower end of each rod has first a threaded section 211, below which it has a square section 212. The edge of the lower table is provided with rectangular notches 213 that receive the squared section 212 and guide the same. Each squared section 212 likewise passes through a guide bracket 215, one of which is shown particularly in Figs. 10, 19 and 20.

These guide brackets 215 have bottom plates that fit against the top of the periphery of the lower table 98 adjacent the notches 213, and they have central depending key elements 216 that interfit with slots 217 in the lower table 98. By this means, proper alignment of the brackets 215 is obtained. The brackets are held in proper position by screws 214.

Each bracket 215 has an upstanding portion 218 rising from the base plate, which is generally in the form of an open-sided square, in section.

This receives the squared section 212 of the rod. There is a removable outer plate 220 attached over this squared section 218 by screws 221. By this means, the rods may be easily removed. The squared sections 212 of the rods, interfittng with squared sleeves 218 and the notches 213, prevent the entire valve plunger assemblies from rotating.

Above the top of the bracket, the threaded portion 211 of each rod 210 is provided with a pair of nuts 223 that are adjustable and lock each other. These determine the maximum downward travel of the rod by striking the top of the bracket 215.

Below the bracket, the bottom end of each rod 209 is provided with a stud 225 that interfits with suitably shaped openings in the bottom of the rod and is held by a setscrew 226. This stud forms a shaft upon which a cam roller 227 rotates. As will appear, the rotation of the several cam rollers 227 on their cam elements causes the valves to be opened and closed in proper timed relationship to the operation of the take-out elements.

From the foregoing, it may be seen that the framework carrying the valves and the take-out operating members rotates about the central shaft 83 in timed relationship with the rotation of the glassware forming machine. The take-out members are provided with the cam rollers 136 which govern their elevation by causing them to slide up and down on their respective pairs of guide rods 112. At the same time, the several valves are provided with their cam rollers 227 that may be actuated to cause the valves to be operated and hence the take-out arms to be opened and closed, at proper points during the rotation. These two cam rollers are governed by cams that are supported upon the vertically adjustable support 91 that is rotatively fixed relative to the rotating framework.

As shown in Figs. 3 and 6, the ware is taken from an open mold, comprising mold sections 230, and is moved with a horizontal component to a conveyor belt 231. Fig. 2 shows that there must be vertical movement during this horizontal translation. The ware must be picked up off of the bottom plate 232 of the mold and slightly elevated so that it will clear the bottom plate. Thereafter, it must be lowered because the conveyor 231 is lower than the mold 230. The vertical movement of the take-out devices permitted by the rods 112 is sufficient to accommodate the foregoing, which is accomplished by a cam track operating with the roller 136.

This cam track comprises generally a circular strip 235 having several elevations. In horizontal view, this track 235 appears as a substantially complete ring, having its ends 236 and 237 adjacent the take-out point (Figs. 6, 7). These two ends, as shown particularly in Fig. 7, are connected by a short track element 240, which completes the ring.

The starting track element 240 (Figs. 7, Sheet 5, 28, 32, Sheet 7) is supported from the fixed support 89 by a bracket 241. This bracket is attached by screws 242 to the periphery of the support 89 at the take-out point. It has a fixed depending pin 243 projecting from its bottom, which pin interfits into an opening in the support 89, by means of which the support bracket 241 is accurately positioned. The track element 240 is removably held to the top of the bracket 241 by screws 244. The interfaces of these two parts are provided with a tongue and groove arrange-

ment 245, by means of which the track is accurately positioned on the bracket.

The track element 240 has a cam depression 247 in its upper surface, which depression is below the level of the end 236 of the track ring 235, and further below the end 237 of the track ring. Consequently, when the cam roller 136 moves to the right in Fig. 7, which is counterclockwise in the other views, it will first rise from the depression 247 and then move onto the track ring 235 at the level of the end 236. After the roller has passed entirely around the ring to the end 237, it will be somewhat higher than it was on the end 236, but it will descend into the groove 247. While it is in the groove 247, the take-out device is lowered to the position shown in Fig. 2, wherein the take-out jaws are properly lowered to engage below the finish of the ware that rests then upon the moving mold bottom plate 232. The initial movement of the cam roller will lift the ware off of the bottom plate while it moves it counterclockwise with respect to the axis 83.

The end 236 of the cam track 235 is shown in Fig. 30. This end extends horizontally until it reaches a second supporting bracket 250 which is similar to the bracket 241 and is similarly attached to the support 89 and to the cam track ring. Just beyond the bracket 250, the cam track ring has a descending portion 252. In the example shown, this descending portion continues until a point approximately 90° counterclockwise from the starting point. At this point, the track again has a horizontal section 253. This section is supported upon a bracket 254 to which it is attached by screws 255. This bracket 254 is held to the support 89 by screws 256.

The horizontal section 253 continues for approximately 90° more and is supported at its other end upon a bracket 258 that may be the same as the bracket 254. Just beyond the bracket 258, the track rises in a section 260 which occupies about 90°. Midway of this rise, the track is supported upon a bracket 261 (Figs. 28 and 33), to which it is held by screws. At approximately 270° from the starting point, the track reaches a final horizontal section 263. At this point, it is supported upon a bracket 264. This horizontal section 237 is at a somewhat higher elevation than the other end 236. Between the brackets 264 and 241, there may be an additional bracket 265. It will be understood that all of these brackets are attached to the periphery of the support 89.

From the foregoing, it will be seen that in a single revolution of the framework each of the take-out devices is caused to move from its starting position shown in Fig. 7, in a complete revolution, during which it first rises slightly to lift the ware out of the mold and off of the bottom plate. Thereafter, it descends to dispose the ware at the level of the conveyor 231. It remains at the lower level until approximately 180° after the starting point, when it again rises to a level slightly higher than the level of the end 236 so that the take-out jaws may pass across the top of the ware. It finally descends again into the groove 247, at which point it is ready once more to receive another piece of ware.

The valve cam roller 227 operates so that the take-out jaws will close over the finish of the ware at the starting position shown in Fig. 6. They remain closed until the ware is over the conveyor 231, when they again open. These operations are performed by cam elements upon which the cam roller 227 acts.

As shown in Figs. 24 through 29 (Sheets 6 and 7), there is a composite valve actuating cam consisting of two elements 275 and 276. The element 275 has a base flange from which an upstanding cam track wall 277 rises. This arcuate wall projects beyond the base flange and has an elongated slot 278 in it. The projecting portion overlies a recess 279 cut into the upstanding cam wall 280 of the element 276. A setscrew 281 passes through the slot 278 and is threaded into a hole 282 in the flange of the element 276, so that these two parts may be held together. It will be seen that jointly they provide a continuous arcuate cam wall, the length of which may be varied by adjusting their relative positions which is permitted by the engagement of the screw 281 in the slot 278.

The two elements 275 and 276 are attached to the periphery of the support 89 inwardly of the cam track 235. It will be seen that the support 89 has a plurality of elongated arcuate slots 285, 286, 287, 288 and 289. The base plates of the two cam elements are provided with a series of threaded openings 290, 291, 292 and 293, respectively.

The opening 290 receives a screw 295 (Fig. 20) that passes through a bushing 296 which, with the screw, pass through the slot 285. The screw is finally threaded into the opening 290. The bushing around this screw also receives another member which will be described. The other attaching means for the track elements are typified by the one shown in Fig. 29. A screw 297 passes through a bushing 298 that fits slidably within the slot 287, and is threaded into the hole 292 in the track element 276. By this means, the track is held securely to the support 89, but may be arcuately adjusted therealong.

This adjustment is accomplished by a rod 300 that has an eye on its end that fits under the bushing 296 and surrounds the same. This rod extends outwardly, as shown in Fig. 28 and Figs. 19-22, to engage threadedly through a hand adjusting knob 301. This knob has a bearing portion 302 adjacent a flange 303. The portion 302 fits through a swivel 305 and is secured by a collar 306 held by a setscrew 307.

The swivel 305 has a shank 308 that has a reduced threaded portion 309 at its upper end. This shank 308 passes through an opening in a bracket 310 that extends from and is supported upon the support 89 by screws 311. A nut 312, with a suitable washer, holds the swivel rotatably onto the bracket 310.

It will be seen that when the handle or knob 301 is turned, the screw 300 threaded into the knob will be drawn outwardly or forced inwardly. This causes displacement of the valve cam track. In order to adjust the cam track 275 alone, it is necessary to loosen the screw 281 first. Otherwise, both cam track elements 275 and 276 will be simultaneously adjusted.

From the foregoing, it may be seen that the valve cam roller 227 will engage the starting or most clockwise end of the cam track portion 277 at the time when the associated take-out device is over the ware with its roller engaged in the cam track notch 247. This will cause the piston to move outwardly, closing the take-out jaws on the ware. This cam roller 227 will remain up while the framework rotates approximately 130°, when it will then descend off of the other end 230 of the cam track. When this occurs, the jaws will again open, releasing the ware onto the conveyor 231.

Air is supplied to the valve for the actuation of the piston from a line 325 (Fig. 4) that is connected into the top of the arm 87. The outer end of this arm has a passage 326 therethrough. The lower end of this arm, at its outer end, has a recess 327 therein that receives a rabbet on the upper end of a combined stuffing box and guide 328. This guide is secured to the arm by screws 329 that pass through the arm and into threaded openings in the flange of the member 328.

This guide has a bore therethrough which has a first enlarged portion 330 that receives the bearing 86. There is a lower reduced portion 331 that is sized to give support and bearing to the upper end of the shaft 83. By this arrangement, the outer end of the arm 87 is supported upon the shaft. The upper end of the shaft is flanged and is engaged by a shaft retainer formed of two half rings 332 and 333 that engage under the flange and fit within the opening 330 in the box member 328.

The stuffing box 328 receives packing 335 that is held in place by a packing gland 336 that is attached to the lower end of the box by screws, as shown. This gland also furnishes a guide means for the upper end of the shaft.

The upper end of the shaft has an opening 340 that registers with the opening 326 in the arm 87, communication being established through the center of the bearing 86. At the bottom end of this bore 340, there is a radial passage 341 that extends to the outside of the shaft. At this point, the shaft is surrounded by a distributor 342 that fits over the shaft 83, as shown in Fig. 4. It is attached to the shaft by a setscrew 343. It provides an air chamber 344 from which five pipes 345 extend, there being one pipe for each of the valves, the pipes being connected to the flexible lines 193.

A brake means is provided to smooth out irregularities in rotation of the parts. This brake is shown particularly in Figs. 4, 11 and 12 (Sheet 3). It includes a drum formed of two complementary semi-cylindrical members 350 and 351. They are fitted together by a groove and rabbet 352, as shown in Figs. 11 and 12, and held by screws 353. This arrangement assures proper alignment of these parts. The cylindrical periphery of these two elements furnishes a groove 354 in which brake band and shoe means operate.

As shown in Fig. 12, there is a somewhat flexible band 355 that passes around the groove 354 and has fittings 356 riveted thereto to provide clamp end 357 that normally are spaced slightly apart when the brake is in its operating condition. This band is provided with a brake lining 358 that may be clamped against the drum 349 in a manner to apply friction to the drum, so that the rotation of the shaft may be deterred. The operating means for this brake includes a spring bolt 360, having a hole through its head and a threaded shank 361 that passes through openings in the two ears 357. This shank is surrounded by a compression coil spring 362 that is retained by a nut and washer arrangement 363. Adjustment of the nut changes the force of the spring, tending to bind the brake band on the drum.

The head of the bolt 360 receives a screw 365 that passes up into a brake anchor post 366 having a threaded end 367 passing through the flange on the arm 87 and attached thereto by a nut 368. By this means, the band 355 and its lining 358 are held non-rotatably while the drum rotates, and the brake may be caused to apply any desired friction to the rotation of the shaft.

Operation

When the glassware forming machine is rotating its molds 60 about its central column, the center shaft 83 of the take-out mechanism will be rotated in time therewith through the medium of the sprocket arrangement shown in Fig. 1. The timing is such that one take-out device is introduced to the starting point, which is the nine-o'clock position in all of the plan views in these drawings, every time a mold 230 is brought to the same position by the forming machine. The forming machine illustrated here, which is described in detail in the applicant's copending application, has ten mold sets on it, and, for the type of ware illustrated, may be operated at six revolutions per minute, which presents a mold 233 at the starting point of the take-out every second. For such speed of the glass machine, the take-out device must rotate twice as fast, or twelve revolutions per minute, in order to bring a new take-out set to each new mold. The speed change afforded by the sprocket mechanism produces this proper relative rotation. It will be seen that, if the speed of the forming machine is changed, the speed of the take-out machine will change correspondingly. The speed ratios are determined solely by the number of mold arms on the forming machine relative to the number of take-out arms on the take-out machine.

Air is continuously supplied through the line 325 to the bore 340 in the top of the shaft 83 and to the distribution chamber 344. From this, it is constantly supplied through all of the outlet pipes 345 to all of the valve housings 192, where it applies pressure to the top of the plungers 188 and urges them downwardly as far as they are permitted to go.

To explain the operation of the machine, it is sufficient to explain a single cycle for one of the take-out devices. At the point of take-out, the ware, here shown as a small-mouthed bottle, is standing on the bottom plate 232 of a finish mold, the sections 230 of which are open. A particular take-out device, approaching its take-out position, will be in the upper position on its respective guide rods 112 caused by the riding of its cam 136 on the highest end 237 of the cam ring 235 (Figs. 7, 30). Its valve will be in the lower position, owing to the fact that the valve cam roller 227 does not engage the end of the track 277 until the take-out jaws are in position to engage the ware. The jaws will be open..

The end 237 of the cam ring 235 is sufficiently high to permit the leading take-out jaw to be moved over the top of the ware standing on the bottom plate of the mold.

Thereupon, the cam roller 136 descends into the notch 247 on the cam track joining member, causing the take-out device to descend on its guide rods 112 into an elevation, as illustrated in Fig. 5, wherein the jaws may properly engage under the finish of the ware. At this operation, the jaws are sufficiently far apart so that the leading jaw may pass across the top of the ware and both jaws descend on opposite sides of the ware without engaging it, despite the continuation of rotation of the rotatable framework.

At a point properly synchronized with the disposition of the open jaws around the ware, the valve cam roller 227 rides up onto the cam edge 277, elevating the valve to the position shown in Fig. 5, porting the compressed air to the line 196 that is connected to the back end of the cylinder 140, and connecting the forward end of the cylinder

to the exhaust through the line 137. The speed with which this takes place is controllable by adjustment of the two valves 202 and 203. The piston is thereby forced radially outwardly, carrying the yoke 146 with it and causing the two jaw holders to close together under the force transmitted through the links 148. These jaws thereby close over the ware engaging it immediately below the finish, as shown in Fig. 5. This operation must be completed by the time the take-out mechanism begins to move beyond a precise nine-o'clock position in Fig. 6, so that the ware will be held at the time lateral force is applied to it. It will be understood that the mold set is rotating with the take-out mechanism, but the mold rotation will tend to withdraw the ware away from the take-out mechanism.

Immediately after the ware is grasped by the take-out device, the cam roller 126 leaves the groove 247 and rides up to the level of the end 236 of the cam ring. This action lifts the take-out device and causes it to lift the ware off of the bottom plate of the mold.

The ware is then conveyed at a fixed elevation for a desired distance, after which the cam roller 136 begins to descend the angular portion 252 of the cam ring. This permits the take-out device to slide downwardly on its guide rods 112, carrying the ware with it. The valve does not normally change its position during this operation, so that the ware continues to be held. After rotation of roughly 90° from the starting point, the cam roller 136 reaches the lower portion 253 of the cam ring 235. This is arranged to provide proper elevation for disposing the ware on the conveyor 231.

When the take-out device reaches this position to discharge the ware to the conveyor 231, the valve cam roller 227 leaves the end 280 of its cam track, whereupon the valve plug descends and connects the line 197 to compressed air and the line 196 to exhaust. This reverses the pressure conditions on the piston 144, causing it to move inwardly, opening the take-out jaws and releasing the ware. The conveyor 231 is operated at a speed so that it will withdraw the ware from the take-out device as that device moves in its arc, counterclockwise in Fig. 3.

Thereafter, the take-out device continues until approximately 180° from its starting point, whereupon its cam roller 136 ascends the incline 260 of the cam ring 235. The valve is not changed during this operation. At some convenient point, such as 270° from the starting point, the cam roller 136 attains the elevation of the end 237 of the cam track, so that the take-out device is elevated again to a position to pass its leading jaw over an item of ware and repeat its cycle.

It may be observed that, with this take-out machine, one take-out device is transferring one bottle while the successive take-out device is engaging a subsequent bottle from a subsequent mold.

The position of the conveyor 231 controls the valve cam operation. Ordinarily, the cam ring 235 will accommodate any disposition of the conveyor 231 around the take-out mechanism because the conveyor is not likely to be less than 90° away from the starting point of the take-out mechanism. However, it will be seen that this cam 235 may easily be changed by being unscrewed from its supporting parts, so that one of different characteristics may be applied to the mechanism.

If the conveyor 231 is further around the take-

out mechanism, so that it is substantially greater than the approximately 90° from the starting point that it occupies in the present illustration, the valve cam will require adjustment. This will require loosening the screw 281, so that the cam element 276 may be advanced counterclockwise around the support 91, thereby to change the point at which the jaws of the take-out devices are opened. If the position of the conveyor 231 is beyond the maximum permissible adjustment of the cam element 276, a cam element somewhat longer may be substituted and supported by a screw passing through the slot 289.

As already noted, the point at which the valve initially moves to its upper position to close the jaws of the take-out device requires accurate adjustment, so that the timing will be proper. Such adjustment may conveniently be made by operation of the hand nut 301 which draws or propels the screw 300 and thereby displaces the first section 275 of the valve operating cam. The screw 281 should be loosened prior to such adjustment in order to avoid changing the position at which the jaws subsequently reopen. However, slight displacement of the end of the cam is not usually critical, so that accurate timing of the lifting of the valve plugs may be made by moving the hand wheel 301 during operation of the machine.

The shape of the finish of the ware, and particularly its elevation, may require particular attention to the height of the take-out device as it approaches the starting position and the elevation to which it descends at the take-out point. These two factors are controlled by the connector 240 between the two ends 236 and 237 of the cam ring 235. These connectors 240 are readily removed and replaced by different connectors having grooves 247 of different depths and shapes. The key arrangement 245 insures proper alignment of the supplement that is actually installed. The track ends 236 and 237 are sufficiently flexible so that slight changes in elevation at these points do not require changes in the supports for the entire cam ring. However, if such changes in the cam ring are necessary, they can be made without great difficulty because the removability of the supports for the ring.

For ware of different height, suitable accommodation is possible with this mechanism. If the bottle is a taller bottle, that projects a greater distance above the bottom plate 232 of the mold, this may ordinarily be accommodated by adjusting the principal support 89 vertically. This adjustment is made by loosening the collars 92 and 93 and turning the upper collar on its threads so that it raises or lowers the support 89 and all of the rotating mechanism, as is required. Such rotation of the collars cannot turn the support because the same is keyed into the upper bushing 68 of the standard. When the proper elevation is attained, the collars are both tightened firmly against the bushing, so that the adjustment will be held. These collars are designed to receive wrenches.

If there is a change in the level of the bottom plate 232 relative to the level of the conveyor 231, this may be taken care of by employing different take-out jaws. Reference to Fig. 5 will show that these jaws have a vertical dimension. This dimension may vary with different jaws and such variation will accommodate for differences in the levels of the bottom plates and the conveyor 231. As already noted, these jaws may be changed so that they may engage ware of different shapes.

The two valves 202 and 203 control the speed

of operation of the piston 144, and hence the speed of the closing and opening movements of the take-out jaws. This adjustment is worked in connection with the adjustment of the hand knob 301 to obtain proper timing, and it also is used to be sure that the jaws close at a speed that will not cause the ware to be struck with excessive force.

The jaws are prevented from closing over center by the pins 168. They may be individually adjusted by the eccentric screws 162, there being one such stud for each of the jaw elements.

The brake mechanism is designed to control the inertial tendency of the rotating parts to have jerky movement. The force applied by the brake is adjustable by adjusting the nut 363 that changes the force exerted by the spring 362.

It will be seen, from the description that has already been made, that the parts of the mechanism may be assembled and disassembled with facility. The several take-out devices are interchangeable, as are parts thereof. The cylinders all have corresponding keys that will engage with any of the keyways, so that these parts may be used interchangeably. Other parts are similarly so designed. The guides 215 may be mentioned in this connection, because they have interfitting keyways that facilitate their positioning and enable them to be changed. The valves likewise are interchangeable as units, as well as in their several parts. All of the parts that require lubrication are readily accessible.

The mechanism, as aforesaid, provides a high speed take-out machine that is very flexible in operation and adjustment, as well as assembly and disassembly.

What is claimed is:

1. A machine for moving glassware and the like, comprising a base, a rotatable support on the base, means for continuously rotating the support, a ware engaging device on the support for rotative movement therewith, means mounting the device on the support for vertical movement, the device including fluid pressure operated means to hold ware, a valve on the support for controlling the fluid pressure means, movement permitting connections between the valve and the fluid pressure operated means, means operated by rotation of the support for effecting operation of the valve to cause the holding means to engage ware at one point in the rotation of the support and for disengaging the same at another point therein, and means operated by movement of the support for displacing the device vertically during such rotation, the means for effecting operation of the valve including a cam track on the base, and a cam follower on the valve, the track having a displacement portion engageable by the follower during rotation of the support, to operate the valve, and means to adjust the length of the displacement portion.

2. A machine for moving glassware and the like, comprising a base, a rotatable support on the base, means for continuously rotating the support, a ware engaging device on the support for rotative movement therewith, means mounting the device on the support for vertical movement, the device including fluid pressure operated means to hold ware, a valve on the support for controlling the fluid pressure means, movement permitting connections between the valve and the fluid pressure operated means, means operated by rotation of the support for effecting operation of the valve to cause the holding means to engage ware at one point in the rotation of the support and for

disengaging the same at another point therein, means operated by movement of the support for displacing the device vertically during such rotation, and means for adjusting at least one of said valve operating points, the means for effecting operation of the valve including a cam track on the base, and a cam follower on the valve, the track having a displacement portion engageable by the follower during rotation of the support, to operate the valve, and means to adjust the length of the displacement portion, including an adjustment member accessible for adjustment during rotation of the support.

3. A machine for moving glassware, including a base, a standard mounted on the base having a bearing at its head, a shaft vertically supported on the base and passing through the bearing, a support having a central, threaded, hollow sleeve surrounding the shaft and depending through the bearing, a collar threaded onto the sleeve and engageable with the bearing to hold up the support, said collar being rotatable to change the elevation of the support, a framework comprising a hollow column around the shaft and fixed thereto, an upper table on the top of the column and a lower table on the bottom of the column, said framework bearing rotatably on the support, a plurality of ware engaging devices mounted on the framework for independent movement thereon, and means to operate the devices including cam elements on the support and cam follower means on the framework.

4. A machine for moving glassware, including a base, a standard mounted on the base having a bearing at its head, a shaft vertically supported on the base and passing through the bearing, a support having a central, threaded, hollow sleeve surrounding the shaft and depending through the bearing, means holding the support against rotation on the bearing, a collar threaded onto the sleeve and engageable with the bearing to hold up the support, said collar being rotatable to change the elevation of the support, a framework comprising a hollow column around the shaft and fixed thereto, an upper table on the top of the column and a lower table on the bottom of the column, said framework bearing rotatably on the support, a plurality of ware engaging devices mounted on the framework for independent movement thereon, and means to operate the devices including cam elements on the support and cam follower means on the framework.

5. In a machine for moving objects such as glassware, a base, a vertical shaft mounted on the base, a framework mounted on the shaft for rotation on the base, the framework including upper and lower members and a plurality of circularly arranged pairs of arcuately spaced tracking elements between the two members and around the axis of the framework, a plurality of ware holding devices, one mounted between the tracking elements of each pair, each ware holding device comprising a rigid bracket disposed between the pair of tracking elements with lateral projections containing tracking portions slidably interfitted with the tracking elements, each bracket having its main portion extending radially of the framework, and transversely to the two tracking elements upon which it is supported, a ware-engaging device mounted on the bracket and projecting radially therefrom, a motor means on the bracket radially inward from the ware-engaging device, and connections between the motor means and the ware-engaging device for operation of the former by the latter; and con-

nections between the base and the framework for causing the rotor means to operate during rotation of the framework.

6. In a machine for moving objects such as glassware, a base, a vertical shaft mounted on the base, a framework mounted on the shaft for rotation on the base, the framework comprising a lower member and an upper member and track means between them, a plurality of ware engaging means mounted on the track means for vertical movement, each having a fluid pressure-operated power device for its operation, a plurality of valves on the upper member and connected to the power devices, and means for operating the valves in timed relation with rotation of the framework, including cam track means mounted on the base below the framework and cam follower means leading thereto from each valve.

7. In a machine for moving objects such as glassware, a base, a vertical shaft mounted on the base, a framework mounted on the shaft for rotation on the base, the framework comprising a lower member and an upper member and track means between them, a plurality of ware engaging means mounted on the track means for vertical movement, each having a fluid pressure-operated power device for its operation, a plurality of valves on the upper member and connected to the power devices, means for operating the valves in timed relation with rotation of the framework, including cam track means mounted on the base below the framework and cam follower means leading thereto from each valve, and fluid pressure supply means extending through the shaft above the framework, and distribution means above the framework and connecting with the several valves.

8. In a machine of the kind described, a base, a vertical shaft rotatably mounted on the base, a framework mounted on the shaft, the framework comprising a lower table mounted on the shaft and vertically supported on the base, a central sleeve-like space element on the shaft over the lower table and secured thereto, an upper table attached to the top of the spacer, a key member extending through the spacer and engageable with the shaft, means on the outside of the spacer for attaching the key member to the spacer, and means between the two tables to support ware engaging means for vertical movement between the tables.

9. In a machine of the kind described, a base, a vertical shaft rotatably mounted on the base, a framework mounted on the shaft, the framework comprising a lower table mounted on the shaft and vertically supported on the base, a central sleeve-like spacer element on the shaft over the lower table and secured thereto, an upper table attached to the top of the spacer, a key member extending through the spacer and engageable with the shaft, means on the outside of the spacer for attaching the key member to the spacer, means between the two tables to support ware engaging means for vertical movement between the tables, the lower table having a depending, threaded, sleeve-like portion surrounding the shaft, and threaded collar means on said portion and engageable on the base, for vertical adjustment of the framework relatively to the base, a key engaging portion in the shaft, the key engaging portion being elongated to permit such vertical movement.

10. In a machine of the kind described, a base, a vertical column rising from the base, a framework mounted on the column for rotation on the

base, the framework comprising upper and lower end members one of which is secured against vertical movement, a plurality of pairs of rod-like elements extending between the two end members, a plurality of ware engaging means, one slidably mounted on each pair of rod-like members for vertical movement, cam and cam track means between the base and the ware engaging means to effect vertical movement of the latter during rotation of the framework, fluid power means for actuating the ware engaging means to cause the same to hold and release ware, a plurality of valves for said fluid power means, mounted on the upper end member and having cam follower actuating means depending through the framework between the pairs of rod-like elements, and cam means on the base below the framework engageable by said cam follower actuating means.

11. In a machine of the kind described, a base, a vertical column rising therefrom, a vertical bearing on the base, a table-like stationary support mounted on the base and extending outward from the column, a framework mounted on the column above the stationary support for rotation on the base, vertically movable ware engaging means mounted on the framework, a cam track on the stationary support outside the framework, cam means connected for operation of the ware engaging means and movable on the cam track, valve means on the framework for controlling the ware engaging means, another cam track on the support, and other cam means connected with the valve means and engageable with the said other cam track, for operation of the valve means during rotation of the framework.

12. In a machine of the kind described, a base, a vertical column rising therefrom, a vertical bearing on the base, a table-like stationary support mounted on the base and extending outward from the column, a framework mounted on the column above the stationary support for rotation on the base, vertically movable ware engaging means mounted on the framework, a cam track on the stationary support outside the framework, cam means connected for operation of the ware engaging means and movable on the cam track, valve means on the framework for controlling the ware engaging means, another cam track on the support, and other cam means connected with the valve means and engageable with the said other cam track, for operation of the valve means during rotation of the framework, the framework being rotatably supported on the stationary member, and means for vertically adjusting the stationary member on the base.

13. In a machine of the kind described, a base, a vertical column rising therefrom, a vertical bearing on the base, a table-like stationary support mounted on the base and extending outward from the column, a framework mounted on the column above the stationary support for rotation on the base, vertically movable ware engaging means mounted on the framework, a cam track on the stationary support outside the framework, cam means connected for operation of the ware engaging means and movable on the cam track,

valve means on the framework for controlling the ware engaging means, another cam track on the support, and other cam means connected with the valve means and engageable with the said other cam track, for operation of the valve means during rotation of the framework, the framework being rotatably supported on the stationary member, means for vertically adjusting the stationary member on the base, and air distribution means supported on the column a distance above the framework to permit vertical adjustment of the framework without disturbing the air distribution means.

14. In a glassware take-out machine, a base, a vertical shaft mounted rotatably on the base, a framework rotatably mounted on the base and including a central column surrounding the shaft and connected therewith to be rotated thereby, upper and lower tables connected to the column at upper and lower points thereon, said tables being substantially horizontal, a plurality of pairs of rods disposed around the peripheries of the tables and extending between the tables; a plurality of brackets, each disposed between the members of a pair of the rods, and each having sleeves slidably supporting it for vertical movement on the rods; a member fixed to the base, cam means between said fixed member and the several brackets to effect vertical movements of the brackets during rotation of the framework; a fluid motor on each bracket, a ware engaging means on each bracket connected with its fluid motor, a plurality of valves on one table, one valve for each fluid motor; fluid connections between each valve and its fluid motor, of the type to maintain fluid connection during vertical movements of the brackets; the cam means for the brackets having portions to cause the ware engaging means to rise above the ware, then descend onto the same, and afterward to lift the ware and transport it laterally; and means to operate the valves to cause the fluid motors to operate the ware engaging means at the time the same descends onto the ware.

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