

March 31, 1953

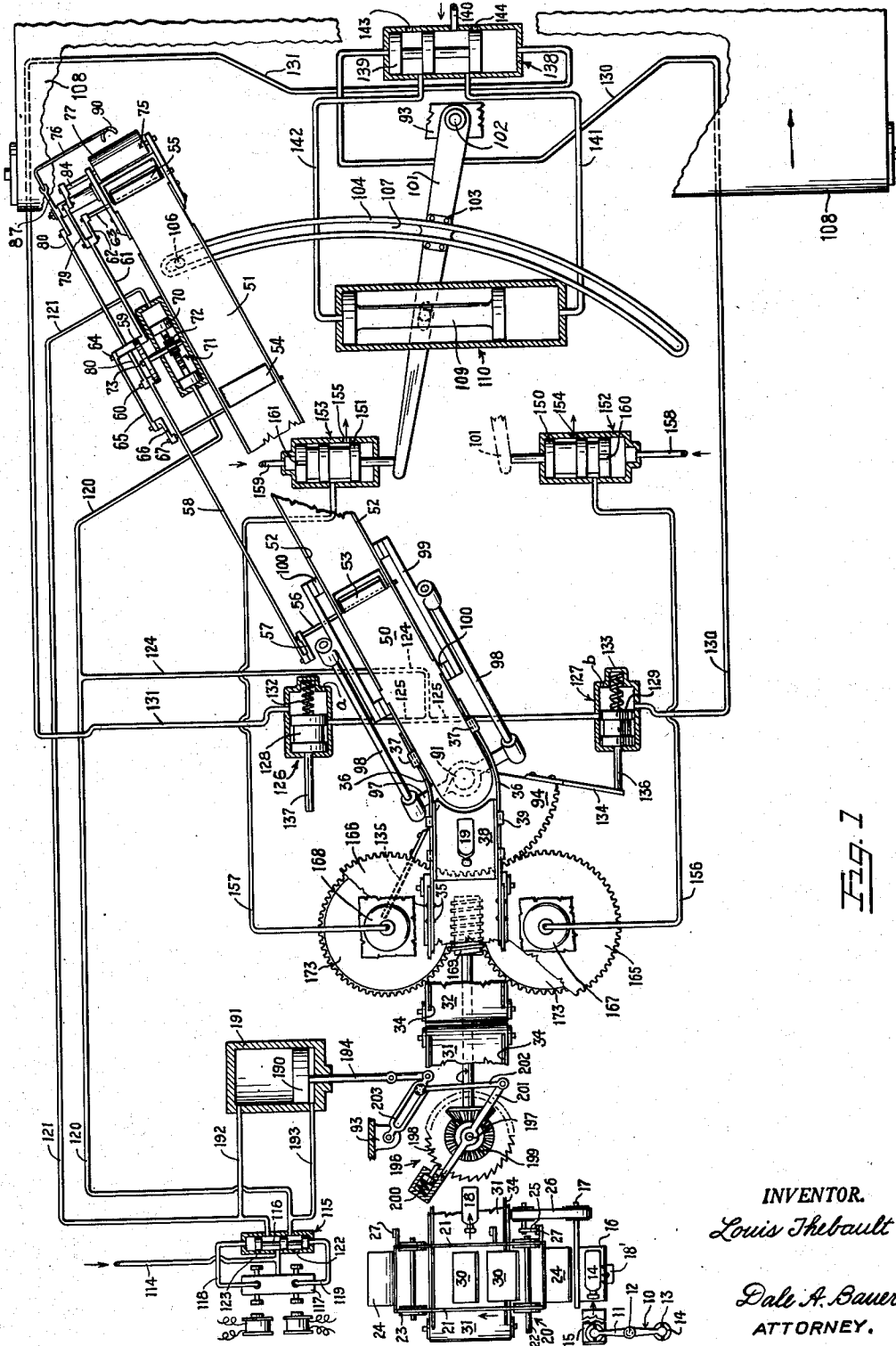
L. THEBAULT

2,633,224

APPARATUS FOR THE DELIVERY OF ARTICLES TO CONVEYERS

Filed Aug. 2, 1946

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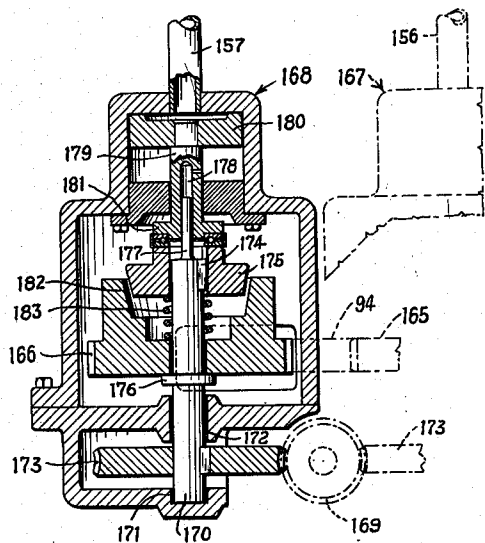


Fig. 2

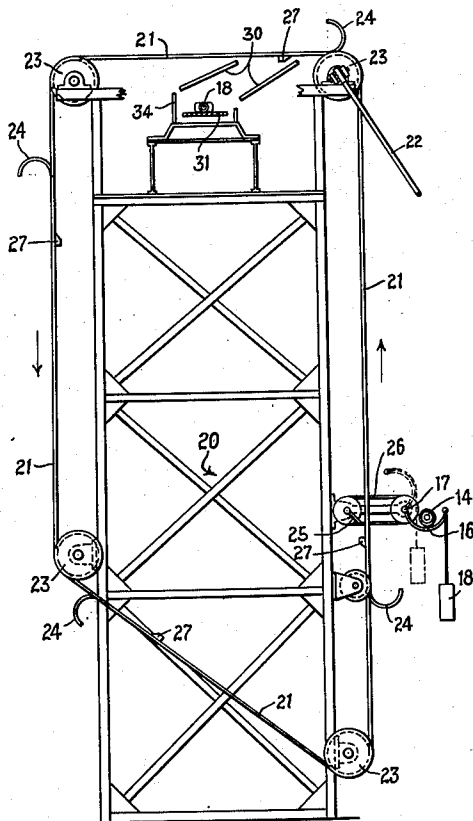


Fig. 3

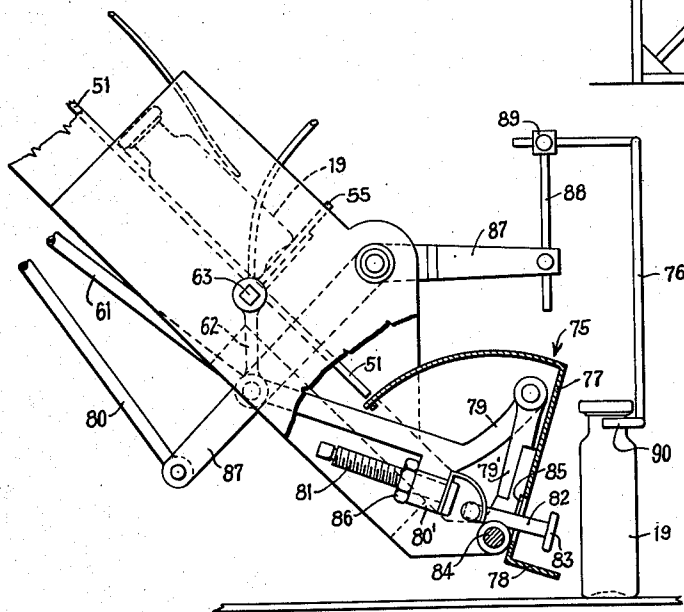


Fig. 4

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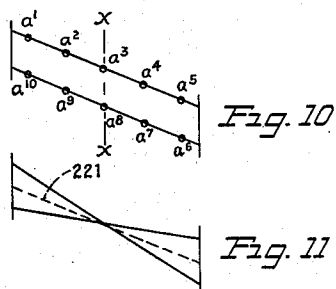
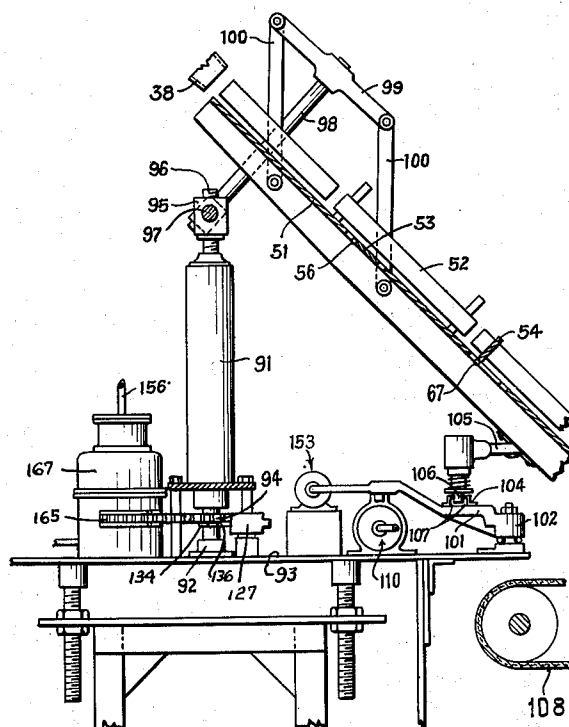


Fig. 5

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UNITED STATES PATENT OFFICE

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APPARATUS FOR THE DELIVERY OF
ARTICLES TO CONVEYERS

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25 Claims. (Cl. 198—31)

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This invention relates to means for delivering articles from positions in line to positions in ranks. The invention will be described in its application to a chute that is primarily adapted to the transference of bottles to a moving conveyor. However, it is to be understood that this, preferred, embodiment of the invention is only illustrative and does not constitute a limitation.

The preferred embodiment of the invention which is described herein relates to an apparatus for transferring bottles from a bottle forming machine to a lehr conveyor. A difficult problem arises in handling the bottles as they are discharged by automatic bottle forming machinery. It has heretofore been proposed to transfer the bottles to a moving conveyor in an upright position or on their sides, but the problem of standing a bottle upon its end on a moving conveyor has been difficult to solve, and bottles on their sides tend to roll.

For some purposes, or use, it is desirable that bottles should be arranged in ranks rather than in a single line, and that it should be possible to vary the arrangement of bottles in the ranks, but heretofore no apparatus has been completely successful in placing bottles upright in selected ranks upon the surface of a moving conveyor.

It is an object of this invention to transfer bottles from a bottle forming machine to a conveyor by means which are capable of coordinating the speed of the machine to the speed of the conveyor.

Another object of the invention is to deliver bottles from positions in line to positions in ranks upon a moving conveyor.

Another object of the invention is to construct an apparatus capable of transferring a series of bottles from positions in line to positions in ranks upon a moving conveyor, and capable of making ranks which are selectively provided with different shapes and relations to other ranks.

Another object is to coordinate the speed of a bottle machine with that of a bottle delivery apparatus by means of a plurality of intermediate conveyors operating at different speeds.

Another object of the invention is to take bottles from a reclining position and to erect them upon the surface of a moving conveyor.

Another object is to deliver bottles by chute to the conveyor and to control the bottles in their passage to the chute and while they are being deposited on the surface of the conveyor.

Another object is to impart to a delivery chute both longitudinal and transverse motion with relation to the surface of a moving conveyor so that unstable articles delivered thereto may be delivered in an upright manner and in precise relation to other similar articles.

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Another object is to impart to a delivery chute motion having transverse and longitudinal components with respect to the motion of a receiving conveyor by means of apparatus capable of adjustment to provide upon the surface of the conveyor different space relationships between the articles delivered.

Another object of the invention is to transfer articles to a conveyor regardless of the difference in level between the starting position and the delivering position.

The above and further objects and novel features of the invention will more fully appear from the following description when the same is read in connection with the accompanying drawings. It is to be expressly understood, however, that the drawings are for the purpose of illustration only and are not intended as a definition of the limits of the invention, reference for this latter purpose being had primarily to the appended claims.

In the drawings, wherein like reference characters refer to like parts throughout the several views,

Fig. 1 is a plan view of an apparatus adapted to transfer bottles from a forming machine to a lehr conveyor, the control mechanism being diagrammatically shown;

Fig. 2 is a vertical section through one of the clutch operated gears for reciprocating the chute;

Fig. 3 is a vertical elevational view of diagrammatic character of an elevator for transferring bottles from a forming machine to a feeding conveyor;

Fig. 4 is an enlarged view of the end of the chute showing the discharging mechanism;

Fig. 5 is an elevational view of the chute and its operating mechanism;

Figs. 6 to 11 are exemplary of the ranks in different alignments; and

Figure 12 shows the apparatus of Fig. 1 a moment later.

Referring now to the numerals of the drawings, the numeral 10 refers to a bottle transfer device which takes bottles from the forming machine and transfers them to an elevator of vertically arranged chain conveyor type. The bottle transfer device has an arm 11, mounted upon a pivot 12, at the ends of which are clutches 13 adapted to pick up bottles 14 and drop them in a chute 15, by which they are delivered to the feeding basket 16 of a basket type chain conveyor or elevator, which accommodates differences in level between the forming apparatus and the lehr conveyor. In Fig. 3 a tower-like framework 20 supports a chain conveyor 21 which is appropriately driven by a rotatable shaft 22. The details of such drives are well understood by engineers and need not be detailed here. The chains of the con-

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veyor pass over pulleys 23. The chains carry, at spaced intervals, baskets 24 which are adapted to receive and to transport bottles. The feeding basket 16 is pivotally mounted at 17 and is weighted at its outer edge, for instance as shown at 18', in order that it may return to position after it has discharged its load to the basket 24. Tripping lever 25 is operatively attached to the delivery basket 16 by appropriate sprocket gears and a chain 26. Tappets 27, in advance of baskets 24, engage the lever 25 and pivot the basket 16 into such position that its contents are discharged into the basket 24, the basket 16 being released by the tappets and returned to original position before engagement takes place between the two baskets.

The basket 24 with its contents are carried by the chains to the top of the tower 20 where it is tilted and discharges its burden into a chute 30 from whence it is deposited upon a conveyor 31. The bottles are thus delivered from the forming machine to a conveyor in line, and it is possible, as has been hereinabove pointed out, to transport them on this conveyor to the place of packing or use where they can be removed by hand or otherwise and used for their intended purpose. However, such a primitive construction does not accomplish the primary objects of this invention or solve the problems of the prior art.

The bottle transfer device is of necessity geared to the speed of the bottle making machine and the chain is of necessity geared to the speed of the bottle delivery means 10. However, that speed may not be a favorable rate for the discharge of the articles onto the final or Lehr conveyor. Furthermore, the problem also exists of the proper spacing of the bottles for ready handling by the apparatus as a whole. These problems of coordination are overcome by the use of a plurality of aligned conveyors 31, 32 of belt type. The conveyor 31 receives the bottles as they are discharged by the conveyor or elevator 21. Its speed of necessity is sufficient to prevent bottles from striking one another as they are discharged by the elevator. The belt conveyor 32, on the other hand, while being driven in the same direction as belt 31, may be driven at a lesser or at a greater speed, depending upon the requirements of the delivery apparatus hereinafter described. By regulating the relative speeds of the two belts, whose speeds might otherwise be in irreconcilable conflict, is smoothly and perfectly conducted.

The sides of the conveyors 31, 32 have guides 34 which prevent the bottles from being accidentally thrown from the conveyors. Fixedly attached to such guides as by means of rivets 35 are flexible guides 36 which are adapted to slide within sleeves 37 attached to the guides at the upper end of pivoted chute 50. A funnel or chute section 38 is suspended from the guide bars 36 by loops 39. The upper end of the chute 50 is arranged approximately over the pivot about which the chute swings so that the conveyor is enabled to discharge its bottles to the chute section 38, which has a sufficient inclination to carry the bottle downward, from whence they slide onto chute section 50. By this conception the applicant is enabled to transfer bottles from a moving conveyor to an angularly moving chute without difficulty and without damage to the bottles.

It is one object of this invention to transfer bottles in line to positions in ranks upon the surface of a moving conveyor. This is accomplished by a moving chute 50 which is traversed

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with respect to the conveyor and is also provided with a longitudinal component of motion between two successive delivering positions equal to the sum of the difference of the ordinates of the two corresponding points of the transverse line to be described on the conveyor and of the forward movement of the conveyor during the same time. This chute is sometimes of considerable length and is sufficiently inclined to employ gravity transfer of the bottles, and the bottles would attain too great speed unless something were done to control their passage through it. In the drawing the chute has been indicated by the numeral 50 and is provided with a bed or floor 51, side guides 52, and pivoted shutters 53, 54, 55. Three shutters are shown, but the number could be greater or less or, in short chutes fed at a sufficiently low rate, could be omitted. The shutter 53, for example, is pivotally mounted upon a shaft 56, the attachment being at one side of the shutter so that the pivoting of the shaft 56 will throw the shutter upward from its normal position as a part of the bed of the chute into position to act as a stop for the bottles. The shaft 56 carries an upwardly extending crank arm 57 which is connected by the rod 58 to a reciprocable disk 59. The disk 59 has a bearing 60 upon which the arm 58 is mounted and a bearing 64 upon which is mounted a rod 61, the other end of which is attached to a downwardly extending crank arm 62 mounted on the end of shaft 63 which carries the shutter 55. When the disk is reciprocated the shutters 53 and 55 are thus operated together, both being raised simultaneously from the bed of the chute to stopping position and both being flattened simultaneously to permit the passage of bottles. To bearing 64 there is also attached a rod 65 that operates the upwardly extending crank arm 66 which is attached to shaft 67 mounted in the chute and carrying the shutter 54. Shutter 54 works in opposition to the shutters 53 and 55; when they are depressed, it is raised, and vice versa.

The disk 59 is reciprocated by means of a double ended piston 70 bearing between its ends a rack 71 engaged with a pinion 72 mounted on the shaft 73 that carries the disk 59. The reciprocation of the piston reciprocates the disk 59 pivotally and operates the shutters. The chute is provided with a pivoted discharging foot 75 and a steadying member 76. The scale of Fig. 1 is too small to show the detailed construction of the discharging foot perfectly. Reference is had to Fig. 4 for that purpose. This foot is an L-shaped member the portion 77 of which in its retracted position forms a continuation of the bed 51 of the chute. In that position the member 78 extends at right angles to the chute and acts to receive and stop the bottle released by the shutter 55. The foot is pivotally operated through arms 79, 79' and rod 61. It is thus worked co-incidentally with shutter 55, but because of the arrangement of the parts, in opposition thereto.

The arm 79 has a depending sleeve 80' into which is screw threaded a support 81, on the end of which is pivotally attached pusher 82 having a head 83 which in retracted position is flush with the part 77 of foot 75. The pusher 82 is fixed upon and turns with a shaft 84, which projects outward and is operated by arm 61 through rod 79 and a lever 79'. In other words, the portion 77 of the foot is rigidly attached to shaft 84 so as to turn with the shaft. The curved rod 79 is attached to the end of the rod 79' which is fixed on shaft 84. The sleeve 80' is mounted on

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an intermediate part of rod 79 and supports pusher 82, 83 flexibly by means of a spring shown in Fig. 4, so that it can be drawn into the plane of part 77 when rod 81 is retracted. A flange 85 acts to prevent the head 83 from being drawn through the bed of the chute. A lock nut 86 holds the support in adjusted position.

The rod 80, attached to a downwardly extending crank arm 87 and to bearing 60, controls the operation of the steadying member 76 which may be conveniently made of wire and mounted adjustably to the size of different bottles. The horizontally extending arm of crank 87 has a split end, or it may by other satisfactory means be made to carry wire rod 88 adjustably as to height. A clamp 89 joins the rod 88 to rod 76, which is angular and carries a steadying fork 90 at its end.

The conveyor 32 delivers a series of bottles such as 18, 19 to the chute, in line, and at a rate coordinated to the operation of the shutters. The bottle 19 shown in Fig. 1 slides down the chute until it is stopped by the shutter 53. The shutter swings into the bed of the machine and the bottle 19 slides down and against shutter 54 which rose in the meantime. When that shutter swings into the bed of the machine the shutter 53 rises again and stops the bottle 18. In the meantime the bottle 19 slides down against the shutter 55. When shutters 53-55 swing into the bed of the chute, the shutter 54 is raised and stops the bottle 18, while the bottle 19 reaches the discharge board 78 of the foot 75. On the next operation of the shutters the foot is tilted somewhat beyond the upright, the pusher 82 thrusts the bottle off the delivery board 78 and onto the surface of the moving conveyor. Due to their relatively small base, some bottles would fall over at the moment of transfer, but member 76 operates through the fork 90 to steady the bottle as it is transferred to the conveyor, being moved out of the way of the bottle on the next swing of the shutter gear. This operation is continued as long as the bottles are fed to the machine.

The placing of the bottles on the conveyor in ranks is accomplished by moving the chute across the conveyor with pivotal reciprocating motion. In order that this be accomplished the chute is mounted on a standard 91 which is pivotally supported upon a bearing 92 which is in turn supported upon a platform 93 of adjustable height. The standard is reciprocated by a gear segment 94. At the upper end of the standard a collar 95 is adjustably mounted upon a screw thread 96 enabling the chute to be positioned at different levels. The collar 95 bears a cross arm 97 from which two arms 98 project upwardly at an angle on either side of the chute. A frame 99 supports hangers 100, which are pivotally attached at their lower ends to the frame of the chute. This construction permits the chute to be moved longitudinally at the same time that it is moved across the conveyor by the pivotally reciprocating standard 91.

The longitudinal motion is imparted to the chute by a novel mechanism which includes an arm 101 pivotally mounted at 102 on the platform 93. Mounted upon the arm 101 for instance by means of bolts 103 is a guide 104. This guide may be of diverse shapes but in the embodiment illustrated in Fig. 1, is curved. A guide 105 is mounted on the chute toward the lower end thereof and has a member 106 which projects into the slot 107 in the curved guide 104. The end of the chute is thereby constrained to follow

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the guide. During the delivery of a rank of bottles the arm 101 and the curved guide 104 are fixed in position. After the delivery of said rank is completed, the arm 101 is caused to swing about its pivot 102 so as to bring the guide 104 to a second position symmetrical with the first one in relation to the axis of the conveyor. A piston 109, which moves within a cylinder 110, reverses the position of the arm and guide.

The shape of the guide is a matter of great importance because by using guides of different shapes it is possible to obtain ranks of different alignment as illustrated in Figs. 6 to 11. In Fig. 7 the two positions of the guide are indicated by the numerals 210, 212, respectively. This guide produces ranks of bottles as indicated by 214 substantially akin to those shown in Fig. 6 wherein the lettered dots are indicative of the bottles as they are placed upon the conveyor by the machine.

In Figs. 8 and 9 is shown the alignment produced by a guide whose shape is as indicated by the two continuous lines of the Fig. 9. This guide produces the alignment of bottles shown in Fig. 8 and by the dotted line 220 of Fig. 9. Alignment in echelon as indicated by the dotted line 221 in Fig. 11 can be produced by a straight guide of which the two positions are indicated in continuous lines in Fig. 11.

The guides need not be of single slot construction but may be formed like a figure 8. For instance, a guide may be shaped like the lines 210, 211, 212, 213 in Fig. 7.

The length and curvature of the guide may be varied in accordance with the speed and width of the conveyor.

If the delivery end of the chute were swung continuously across the surface of the conveyor, there would be a tendency to upset the bottle as it was discharged. In bottles of narrow base this tendency has sufficient importance to require attention; it has been overcome by imparting to the chute interrupted reciprocating motion. The motion of the chute ceases as each bottle is discharged to the surface of the conveyor, being immediately resumed as soon as the discharge is completed.

The machine coordinates the operation of an apparatus for delivering bottles from a forming machine with those of a swinging chute having interrupted lateral and longitudinal motion, with means to control the passage of an article through the chute, with means to discharge each article upon a moving conveyor and to steady it while it is being discharged, and with apparatus capable of laying articles delivered by the chute in ranks of different order. These many and complex functions are accomplished by a novel control system that is preferably operated by compressed gas such as compressed air or steam. This apparatus is remarkably simple considering the complexity of the functions which are to be coordinated and is substantially self-controlled.

A pipe line 114 delivers compressed air to the mid-portion of a cylinder 115 having a triple headed piston 116 and to an electrical pulsator valve 117 which acts at regular intervals to deliver compressed air through pipes 118, 119 to the ends of cylinder 115 whereby to reciprocate piston 116. The reciprocation of piston 116 delivers compressed air from the pipe 114 alternately to pipe lines 120, 121. Openings 122, 123 in cylinder 115 permit the alternate discharge of the lines 120, 121, respectively. As shown in

the drawing Fig. 1, the compressed air is being delivered to pipe line 121 while pipe line 120 is being discharged.

The pipe line 121 serves one end of the cylinder containing piston 70. The pipe line 120 serves the other end of said piston. The alternate charges of compressed air delivered by and to the pipe lines 120, 121 reciprocate the piston 70 and control the operation of the shutters, the delivery board, and the bottle stabilizer.

A pipe line 124 connected to pipe line 120 feeds a pipe line 125 which is connected at its ends to the mid-portions of cylinders 126, 127 that contain pistons 128, 129, respectively, which in one extremity of the cylinder prevent the discharge of air from line 125, and in the other end of the cylinder permit it to be discharged through the reduced mid-portion of the piston to pipe lines 130, 131. In the position shown in the drawing Fig. 12, pressure from line 120 is passing through pipes 124, 125 and piston 129 to line 130, while the end of piston 128 prevents the delivery of air to line 131.

The pistons 128, 129 are forced by springs 132, 133 toward blocking position, which is illustrated in cylinder 126 (Fig. 1). In that figure the chute is swinging counterclockwise and is just about to compress the spring 133 in cylinder 127, which is shown compressed in Fig. 12. The rack 94 carries arms 135, 134 that make alternate contact with piston rods 136, 137. The arms are carried by rack 34 in a lower plane than the rack itself so that the arms do not engage the gears 165—166. When such contact is made, as shown in cylinder 127 Fig. 1, the force of the spring is overcome and the piston is moved to a position which permits the discharge of compressed air into the servient line. The lines 130, 131 are connected to the opposite ends of a cylinder 138. In the position shown in the drawing Fig. 1, compressed air is not being received by the cylinder 138 through the line 130 or 131 so that the triple headed piston 139 remains in its position, both lines 130—131 being blocked as neither spring 132—133 is compressed. A pipe line 140 delivers compressed air to the mid-portion of the cylinder 138 and the reciprocation of the piston 139 delivers the air alternately through the reduced mid-portions of the piston to lines 141, 142, which are in turn connected to the opposite ends of cylinder 110 that contains piston 109 which controls the reciprocation of the arm 101. In the position shown in Fig. 1, the pipe 140 is delivering air to pipe 141 while the pipe 142 is discharging through opening 143. An opening 144 provides for the discharge of pipe 141 when compressed air is received in the cylinder 138 through line 130 as in Fig. 12. To discharge into the surrounding atmosphere the compressed air contained between cylinder 138 and the ends of piston 139, the pipe lines 125, 125 and 131, 130 are connected to cylinders 126, 127, respectively, in axially spaced relation and the cylinders are provided with outlet orifices *a* and *b*, respectively. As may be seen on the figure, when the end of piston 128 covers the entrance of pipe line 125, it prevents the passage of the air from pipe line 125 to pipe line 131, the latter then being in free communication with the surrounding atmosphere through the bottom of cylinder 126 and outlet *a*, thus enabling the discharge of the air coming from cylinder 138.

The swing of the arm 101 from one piston valve to the other is rapid, so that no substantial period of time passes with the end of the

arm 101 in mid-position. It may be considered that that arm is in continuous engagement with one or the other of the valve rods that control the reciprocation of the chute.

Reciprocations of the chute are controlled by piston valves 150, 151 which are in turn operated by the arm 101. The piston valves operate in cylinders 152, 153 which have openings 154, 155 and pipe lines 156, 157 in the side walls thereof. The pistons are triple headed, operating in one position in the cylinder to admit compressed air to the pipe line and in the other position to discharge the pipe line. The pistons are continually subjected to pressure from lines 158, 159 so that, except when under the control of arm 101, they are thrust inward away from the lines 158, 159.

Openings 160, 161 in the end heads of the pistons permit the compressed air to pass to the pipe lines 156, 157 through the reduced portion of the piston, when the piston is positioned as shown in cylinder 152 (Fig. 1). When the arm 101 overcomes the force of the compressed air operating upon the piston, it is moved to a position which permits the discharge of the pipe lines 156 or 157 through the opening 154 or 155.

The rack 94 is in mesh with a plurality of gears 165, 166 supported in housings 167, 168 which also contain the clutch and drive mechanism for reciprocating the rack and the chute. Fig. 2 shows a vertical section through one of the said housings. The casing 168 contains bearings 171, 172 in which is mounted a shaft 170, upon the lower end of which is fixedly mounted a worm wheel 173 in mesh with a driving worm 169. Each housing 167, 168 contains a worm wheel which is continuously in mesh with the worm 169. The shaft 170 is rotated by the rotation of the worm 169 and transmits its motion through a key 174 to a vertically slidable clutch member 175 mounted on the shaft. The shaft has a collar 176, which is preferably formed integrally therewith, upon which rides a gear 166 which is continuously in mesh with the rack 94 and is freely rotatable about the shaft 170. The upper end of the shaft 170 has a reduced spindle 171 which projects within a hole 178 within the rod 179 of piston 180. The lower end of shaft 179 has an annular flange 181 which bears, preferably through ball bearings, upon the upper surface of clutch element 175. The clutch element 175 is normally held by spring 183 out of engagement with the corresponding clutch element 182 formed on the gear 166. When the piston 180 is depressed by compressed air from pipe line 157, the flange 181 forces the clutch member 175 into engagement with clutch member 182 so that the gear 166 is rotated by the worm 169. Thus, when the arm 101 is in operating relation to the piston valve 151, air is admitted through piston valve 150 to housing 167 forcing the clutch elements to engage and rotate the rack 94 through gear 165. At the same time, the corresponding clutch member in housing 168 is released and thrown out of operation by its spring so that the engaging gear 166 idles upon its shaft.

Returning now primarily to Fig. 1, intermittent motion is imparted to the worm 169 by a piston 190 which is reciprocated in a cylinder 191 by compressed air received through lines 192, 193, respectively, from cylinder 115. The timing of the action of piston 190 is coordinated through the pulsator with all the other motions produced in the apparatus. The piston 190 through the piston rod 194 reciprocates a pawl and ratchet

wheel gear which is indicated generally by the numeral 196. A shaft 197 carries the ratchet wheel 198 and a bevelled gear 199, both of which are keyed thereto. A pawl 200 is carried by an arm 201 which is mounted for free pivotal movement upon the shaft 197. The arm 201 is connected by link 202 and slotted lever 203 to the piston rod 194. The length of the stroke can be varied by adjusting the position of the end of rod 202 within the slot of lever 203.

At the instant shown in Fig. 12, compressed air is being admitted to cylinder 168, and cylinder 167 is discharging through line 156, so that gear 166 is being intermittently rotated counterclockwise and the chute is starting its interrupted motion clockwise across the conveyor. As soon as abutment 134 leaves rod 136 both valves 127 and 126 are closed by their springs. This position of the controlling valves is maintained until abutment 135 opens piston valve 126 to reverse the position of arm 101, moving the chute backward, and arm 101 operates valve 153 to release cylinder 168 and operate valve 152 and cylinder 167. The thread of screw 169 is diagrammatically shown; it will be threaded to give the proper direction to gears 165—166 and segment 94. It should be borne in mind that Figs. 1 and 12 illustrate changes as they occur in successive periods of time and do not represent the position of the valves at opposite ends of the arc traversed by the chute. The shutters, discharge foot and piston 190 work evenly and intermittently, being timed by the pulsator to the speed of the bottles in the chute, and the valves 138, 152, 153, 127, 126, 167 and 168 work at the ends of the arc traversed by the chute to reverse its direction. The mechanism 190—198—169—165—166 is an intermittent motion and reversing gear. The shutters, foot, and their operating mechanism are a bottle advancing, control and discharge mechanism.

The advantages of the invention are exemplified by Figs. 6 to 11, wherein are shown examples of the bottle alignments that can be produced by this mechanism. Fig. 6 shows the bottle arrangement produced by a distributor swung along paths 210, 212 of Fig. 7. Motion can be deemed to start at the junction of lines 211 and 212 proceeding along 212 to its end, backward along the edge of the conveyor on line 213, and thence forward on line 210 and back on line 211. The dotted line 214 shows the resultant path upon which the bottles in each rank are placed, being represented by dots numbered a^1 , a^2 , etc. Figures 8, 9, and 10, 11 are further examples of article arrangements producible by the employment of a guide of particular shape. The line X—X is the centerline of the conveyor. The articles may be delivered in straight lines or in curved lines, perpendicular to the conveyor axis or diagonally, in aligned or offset files. The trajectory of the distributor has a longitudinal component between two successive delivering positions equal to the sum of the difference of the ordinates of the two corresponding points of the transverse line to be described on the conveyor and of the forward movement of the conveyor during the same time. The arrangement of the articles on the conveyor will depend upon the stroke of the pawl and ratchet, the shape of the guide, and the timing of the pulsator. Breakable articles can be handled without damage by controlling the length of the drop between shutters so that the speed of the sliding article does not exceed that which is safe.

The combination is novel as a whole and individual novelty resides in many of its parts.

This application is a continuation in part of my application Serial No. 595,046, filed May 21, 1945, and now abandoned.

As many apparently widely different embodiments of this invention can be made without departing from the spirit and scope thereof, it is to be understood that I do not limit myself to the specific embodiment thereof except as defined in the appended claims.

What is claimed is:

1. Bottle handling apparatus comprising a conveyor, chute means adapted to deliver articles to the conveyor, a pivoted standard supporting said delivery means for limited longitudinal displacement, article control means associated with said delivery means, means to impart pivotal reciprocating motion to said delivery means, a pivoted reciprocable lever mounted in proximity to said delivery means, a guide thereon, a cooperating guide carried by said delivery means, means to reciprocate said lever, and means to coordinate the reciprocations of said lever and said delivery means.

2. Bottle handling apparatus comprising a conveyor, chute means adapted to deliver articles to the conveyor, a pivoted standard, a pair of supports projecting from said standard, pivoted arms depending from said supports and mounting said delivery means for limited longitudinal displacement, article control means associated with said delivery means, means to impart pivotal reciprocating motion to said delivery means, a pivoted reciprocable lever mounted in proximity to said delivery means, a guide thereon, a cooperating guide carried by said delivery means, means to reciprocate said lever, and means to coordinate the reciprocations of said lever and said delivery means.

3. Bottle handling apparatus comprising a conveyor, chute means adapted to deliver articles to the conveyor, a pivoted support, pivotal means mounting said chute on said support for limited displacement with respect thereto, a pivoted article control means in said chute, a pivoted article delivery board at the end of said chute, an article stabilizer, means to coordinate the control, delivery and stabilizer means, a gear segment attached to said support, means to reciprocate said segment whereby to impart pivotal reciprocating motion to said chute, a pivoted reciprocable lever mounted in proximity to said delivery means, a guide thereon, a cooperating guide carried by said chute, means to reciprocate said lever, and means to coordinate the reciprocations of said lever and said chute.

4. Bottle handling apparatus comprising a conveyor, a chute adapted to deliver articles to the conveyor, a pivoted standard, a pair of supports projecting from said standard beside the chute, pivoted arms depending from said supports and mounting said chute for limited longitudinal displacement, a pivoted shutter in said chute, a pivoted delivery board at the end of said chute, an article stabilizer pivoted to said chute in cooperation with said delivery board, a pivoted disc carried by said chute, means to reciprocate the disc comprising a pressure operated piston, means operatively connecting said disc to said shutter, stabilizer and board, a gear segment attached to said standard, oppositely rotatable gears meshed with said segment, a screw, clutch elements meshed therewith, means to intermittently turn the screw comprising a pressure operated

piston, and a pawl and ratchet gear, means to engage said clutches alternately with said gears whereby to impart pivotal reciprocating motion to said chute comprising pressure operated pistons, a pivoted reciprocable lever, a guide thereon, a cooperating guide carried by said chute, means to reciprocate said lever comprising a pressure operated piston, a source of fluid under pressure, means to deliver said fluid alternately to the ends of said pistons, and means to coordinate the reciprocations of said lever and said chute.

5. Bottle handling apparatus comprising a conveyor, a chute adapted to deliver articles to the conveyor, a pivoted standard, means to mount said chute upon said standard for limited longitudinal displacement, article control means in said chute, article delivery means at the end of said chute, an article stabilizer constructed and arranged to cooperate with said delivery means, means to operate the delivery means and stabilizer to control the delivery of articles to the conveyor, means to impart pivotal reciprocating motion to said chute, a pivoted reciprocable lever, a guide thereon, a cooperating guide carried by said chute, means to reciprocate said lever, a source of fluid under pressure, means to deliver said fluid to the operating means, and means to coordinate the reciprocations of said lever and said chute comprising valves operable by said lever between the source of pressure and said chute pivoting means, and valves operable by said chute between the source of pressure and the lever reciprocating means.

6. Bottle handling apparatus comprising a conveyor, a chute adapted to deliver articles to the conveyor, a pivoted standard, a pair of supports projecting from said standard beside the chute, pivoted arms depending from said supports and mounting said chute for limited longitudinal displacement, pivoted shutters in said chute, a pivoted delivery board at the end of said chute, an article stabilizer pivoted to said chute in cooperation with said delivery board, a pivoted disc carried by said chute, means to reciprocate the disc comprising a pressure operated piston, means operatively connecting said disc to said shutters, stabilizer, and board, a gear segment attached to said standard, oppositely rotatable gears meshed with said segment, a screw, clutch elements meshed therewith, means to intermittently turn the screw comprising a pressure operated piston and a pawl and ratchet gear, means to engage said clutches alternately with said gears whereby to impart pivotal reciprocating motion to said chute comprising pressure operated pistons, a pivoted reciprocable lever, a curved guide thereon, a cooperating guide carried by said chute, means to reciprocate said lever comprising a pressure operated piston, a source of fluid under pressure, means to deliver said fluid alternately to the ends of said piston, means to coordinate the reciprocations of said lever and said chute comprising valves operable by said lever between the source of pressure and said clutches, and valves operable by said chute between the source of pressure and the lever-operating piston.

7. Bottle handling apparatus comprising a conveyor, a chute adapted to deliver articles to the conveyor, a pivoted standard, a pair of supports projecting from said standard beside the chute, pivoted arms depending from said supports and mounting said chute for limited longitudinal displacement, pivoted shutters in said chute, a pivoted delivery board at the end of said chute, an article stabilizer pivoted to said chute in coop-

eration with said delivery board, a pivoted disc carried by said chute, means to reciprocate the disc comprising a pressure operated piston, means operatively connecting said disc to said shutters, stabilizer, and board, a gear segment attached to said standard, oppositely rotatable gears meshed with said segment, a screw, clutch elements meshed therewith, means to intermittently turn the screw comprising a pressure operated piston and a pawl and ratchet gear, means to engage said clutches alternately with said gears whereby to impart pivotal reciprocating motion to said chute comprising pressure operated pistons, a pivoted reciprocable lever, a curved guide thereon, a cooperating guide carried by said chute, means to reciprocate said lever comprising a pressure operated piston, a source of fluid under pressure, means to deliver said fluid alternately to the ends of the said pistons, means to coordinate the reciprocations of said lever and said chute comprising valves operable by said lever between the source of pressure and said clutches and valves operable by said chute between the source of pressure and the lever-operating piston, a conveyor coordinated with the speed of the shutters adapted to deliver articles to the chute, means between the chute and the coordinated conveyor to compensate for the motion of the chute, an article delivery means, and a conveyor coordinated to the speed of the delivery means adapted to transport the articles and deliver them to said coordinated conveyor.

8. Article handling apparatus comprising means to deliver articles to a chute, a chute constructed and arranged for movement lengthwise of a conveyor, a conveyor adapted to receive articles from the chute, means to mount the chute comprising a pivot, a gear segment attached thereto, a plurality of gears meshed with said segment, clutches operatively associated with said gears, means to alternately engage said clutches whereby to reverse said segment and reciprocate said chute, means to move the chute lengthwise of the conveyor, means to supply power to the several means, and means to coordinate the operation thereof.

9. Article handling apparatus comprising means to deliver articles to a chute, a chute constructed and arranged for movement lengthwise of a conveyor, a conveyor adapted to receive articles from the chute, pivotal means to mount the chute, a gear segment attached thereto, a plurality of gears meshed with said segment, clutches operatively associated with said gears, means to alternately engage said clutches whereby to reverse said segment and reciprocate said chute comprising a plurality of valves respectively attached to said clutches, means to operate the valves comprising means to move the chute lengthwise of the conveyor, means to supply power to the several means, and means to coordinate the operation thereof.

10. Article handling apparatus comprising means to deliver articles to a chute, a chute, a conveyor, means to move the chute across the conveyor, means to move the chute lengthwise of the conveyor comprising a pivoted arm mounted in proximity to said delivery means, interconnected guides on the arm and the chute, power means to reciprocate the arm, valve means to control the reciprocation of said power means and said arm, and means on the chute constructed and arranged to operate said valves.

11. Article handling apparatus comprising means to deliver articles to a chute, a chute, a

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conveyor, means to move the chute across the conveyor, means to move the chute along the conveyor, means to supply the several said means with power comprising fluid operated pistons, a source of fluid pressure, and a pulsator constructed and arranged to control said fluid to operate the said pistons.

12. Article handling means including a conveyor, an axially movable chute having its discharge end above the conveyor, said chute being pivotally mounted at a distance from its discharge end, a pivoted arm extending in a direction lengthwise of the conveyor, piston means connected to said arm for motion transverse to the axis of the arm, guide means carried crosswise by said arm engaged with guide means on said chute, means to pivot said chute across the conveyor with intermittent motion, means to discharge articles to the conveyor from said chute during the intermissions in the crosswise motion thereof, and means to operate said piston means at the end of each trip across the conveyor.

13. The apparatus of claim 12 in which the guide means on the arm is arcuate.

14. The apparatus of claim 12 in which the guide means on the arm has crossed paths.

15. Article handling means including a conveyor, a chute extending over the conveyor, means to suspend the chute for pivotal motion across the conveyor and for motion lengthwise thereof, means to pivot the chute intermittently through arcs of similar size, and means to move the chute backward relative to the conveyor at the end of each trip across the conveyor and to move the chute forward relative to the conveyor during each movement in arc comprising a pivoted arm, a slotted guide engaging the chute and said arm, and means to replace said guide with a slotted guide of other shape.

16. The apparatus of claim 15 in which the chute is of gravity type and is provided with alternately operating, pivoted shutters in the floor thereof, and means to raise and lower said shutters alternately in synchronism.

17. The apparatus of claim 12 in which fluid pressure means supplies pressure through pipe lines to valves controlling the admission of the fluid to pistons operatively connected to said pivoted arm and to said pivoted chute.

18. In the apparatus of claim 12 abutment means associated with said pivoted arm and said chute, and controlling valves provided for said arm and chute of impact type operable by said abutment means to supply pressure to pistons operatively connected thereto.

19. The apparatus of claim 12 in which the means for intermittently pivoting the chute comprises a pulsator in a fluid pressure line, a piston operated thereby, and a ratchet gear operable by said piston operatively connected to said pivoted chute.

20. The apparatus of claim 12 in which the chute is connected to a ratchet gear by a piston operated reverse gear, and in which the operation of said reverse gear is controlled by impact type valves at the end of each trip across the conveyor.

21. An apparatus for depositing articles on a moving conveyor comprising a chute having an inclined, longitudinal axis, a support for the chute comprising spaced pivoted arms forming, with the chute, sides of an articulated parallelogram, upon which the chute is pivotally mounted, the lower end of the chute being above and adjacent to the conveyor, and means to oscillate

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said chute about said support across the conveyor.

22. In an apparatus for automatically delivering unstable articles to a traveling conveyor in transverse lines, a gravity type distributor feeding articles to said conveyor, the terminal part of said distributor comprising an L-shaped member supported on a horizontal axle, having a foot projecting up from the surface of the distributor, means to tilt said member to bring each article to a vertical position, pusher means operatively associated with said member to dislodge articles from said member and stabilizing means associated with said member to steady each article during the operation of the pusher.

23. In an apparatus for delivering articles to a conveyor, a distributor carrying articles toward the conveyor, an L-shaped member having a foot projecting into the path of articles traveling along the distributor, means to pivot the L-shaped member to bring the foot into discharge position above the conveyor, and pusher means operatively associated therewith to dislodge the article from the L-shaped member onto the conveyor when the foot is in discharge position.

24. Article handling apparatus comprising a conveyor, means to deliver elongated articles to a chute, a chute, a pivoted shutter adapted to form a part of the bed of the chute, means to oscillate the shutter, a delivery board pivoted to the chute, having a foot to arrest and support articles, means to oscillate the delivery board about its pivot in alternation with the shutter to erect the articles above the conveyor, and means to dislodge the articles from the foot in upright position.

25. Article handling apparatus comprising means to deliver articles to a chute, a gravity type chute, a conveyor, means to move the chute across the conveyor, suspension type parallel motion supporting means for said chute permitting axial motion of said chute relative to said delivery means and said conveyor, a pivoted arm beneath the discharge end of the chute, a guide carried by the arm, a cooperating guide carried by the chute, one of said guides including a rail and the other comprising a rail follower, and means to pivot the arm through a limited arc as the chute reaches the ends of its motion across the conveyor.

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