

Aug. 2, 1927.

E. H. LORENZ ET AL

1,637,490

GLASSWARE TRANSFERRING DEVICE

Filed Aug. 25, 1925

5 Sheets-Sheet 1.

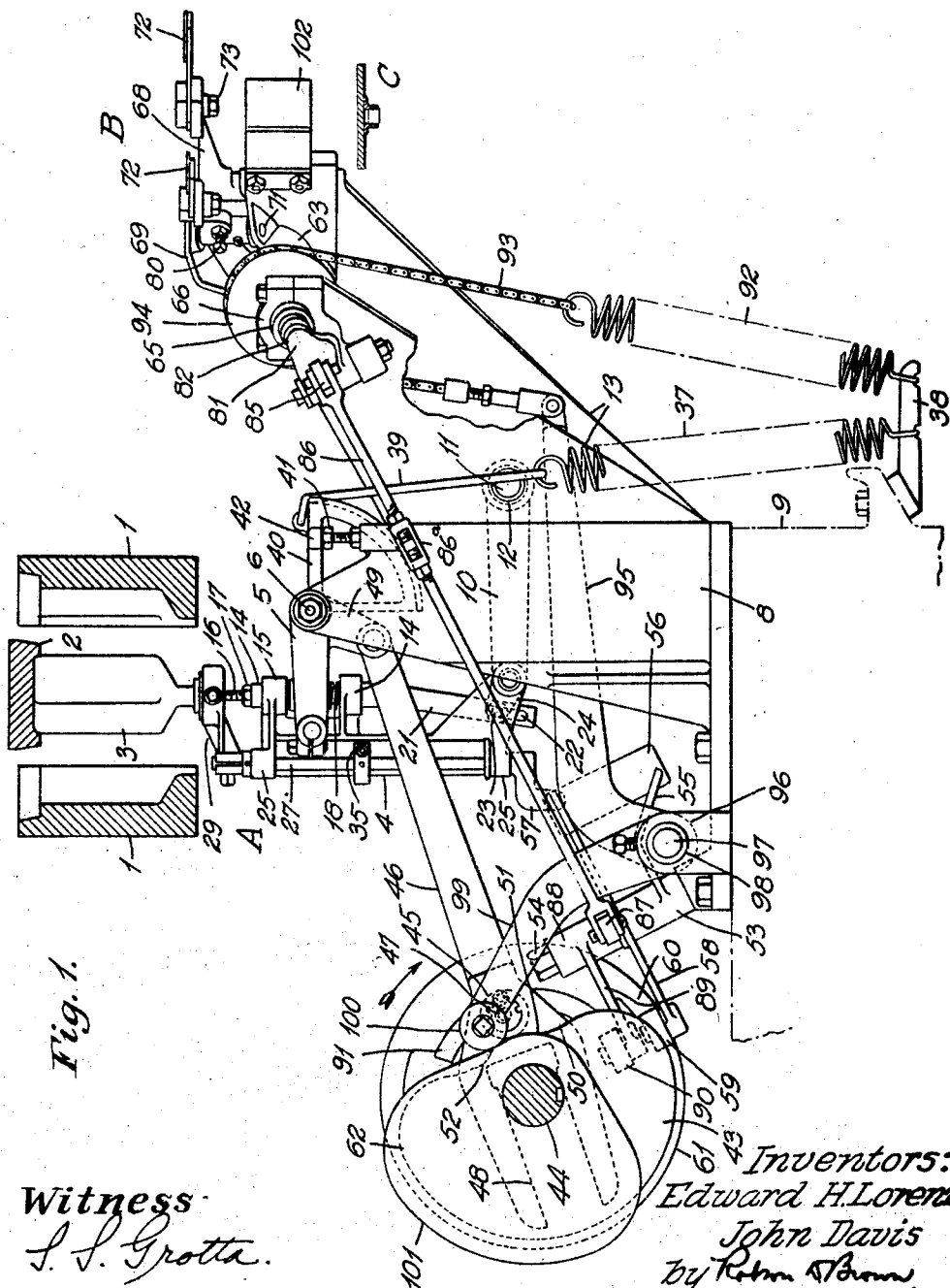


Fig. 1.

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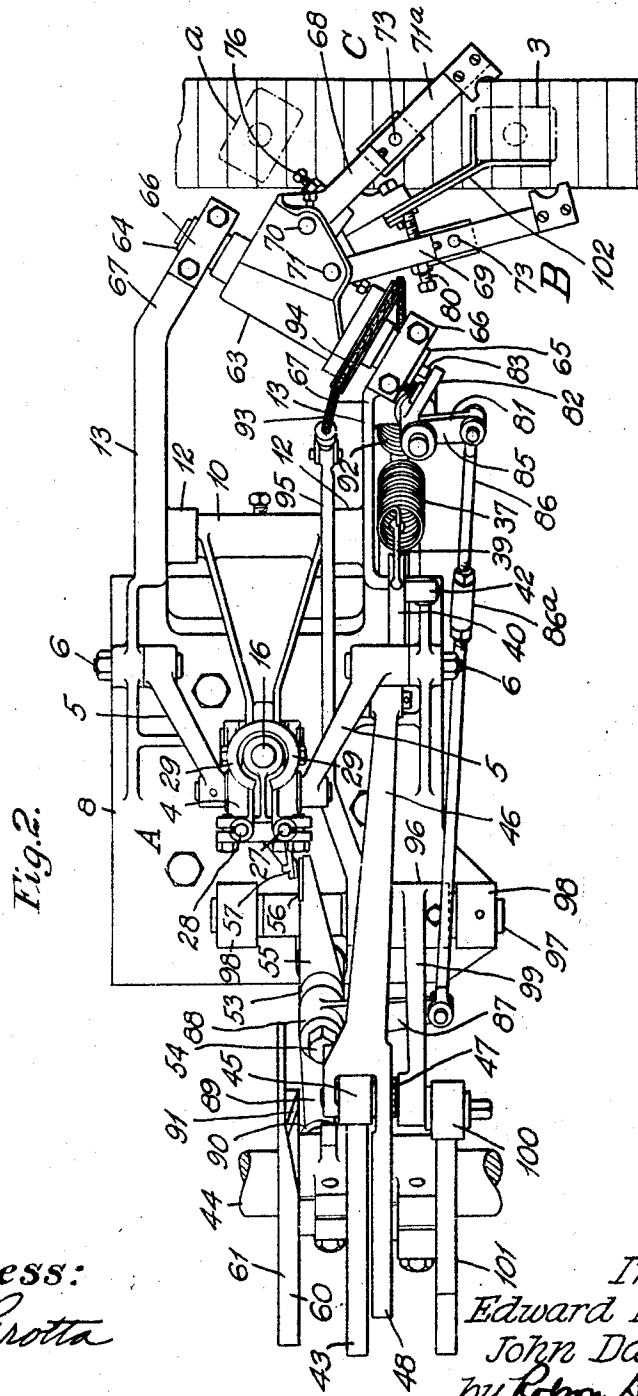
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5 Sheets-Sheet 2



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Fig. 3.

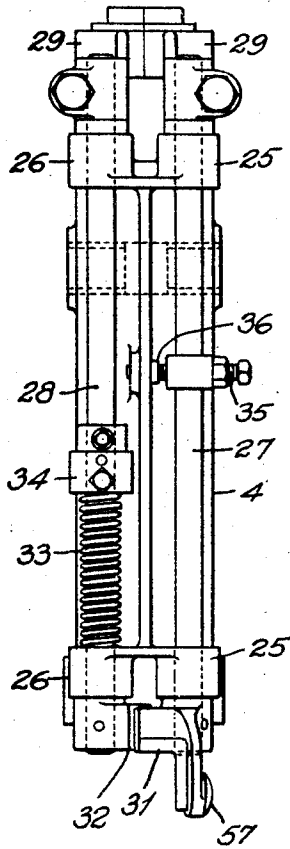


Fig. 4.

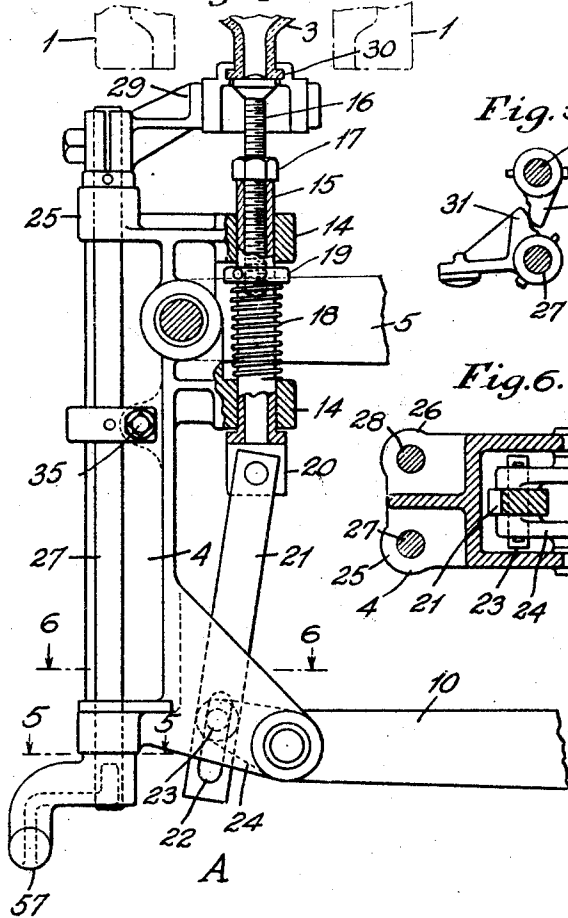


Fig. 5.

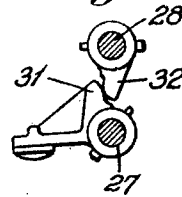
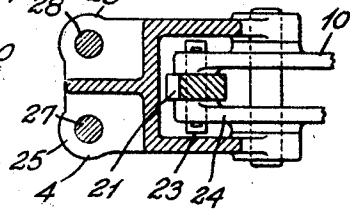


Fig. 6.



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Fig. 7.

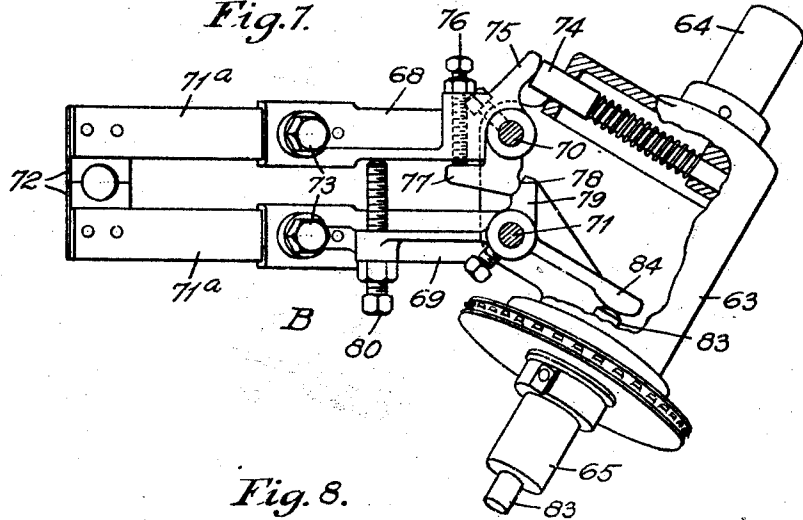
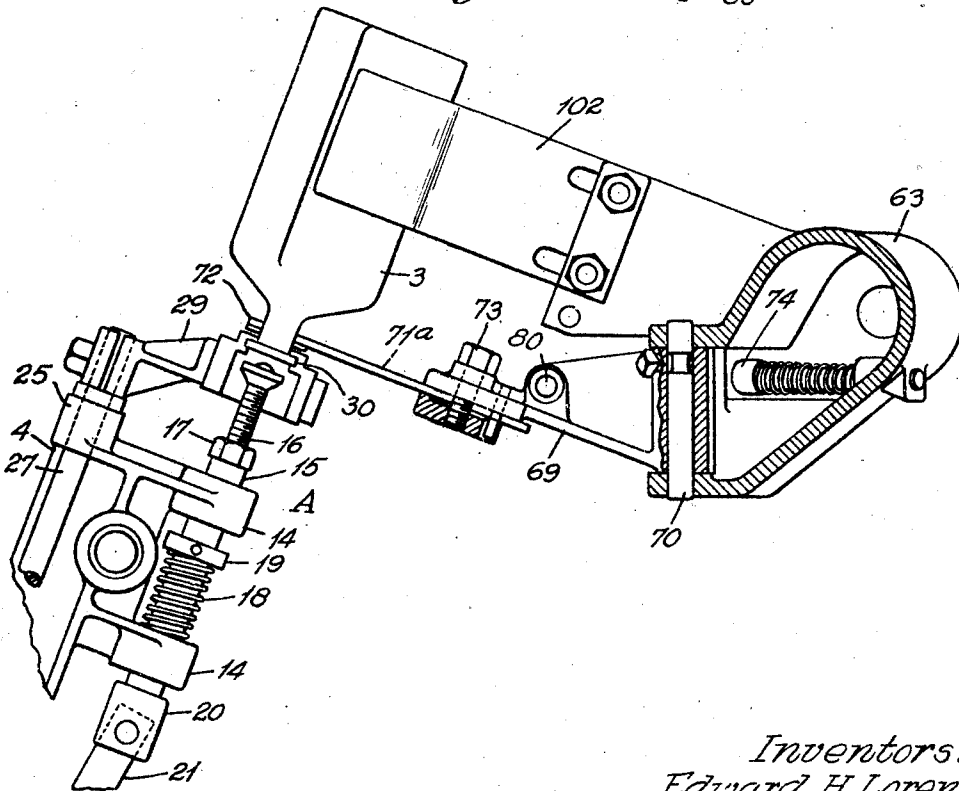


Fig. 8.



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Fig. 9.

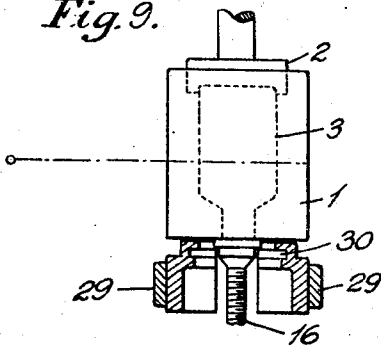


Fig. 10.

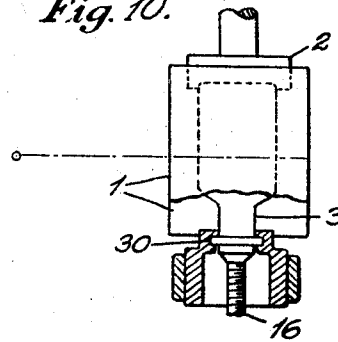


Fig. 11.

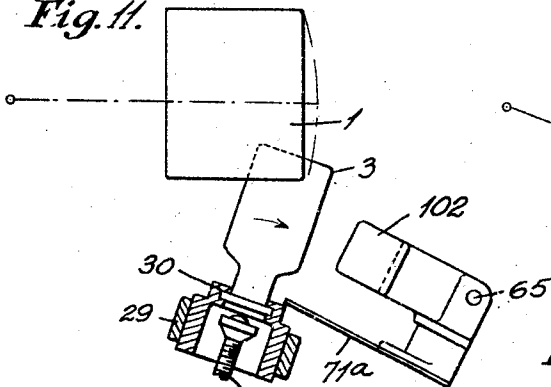


Fig. 12.

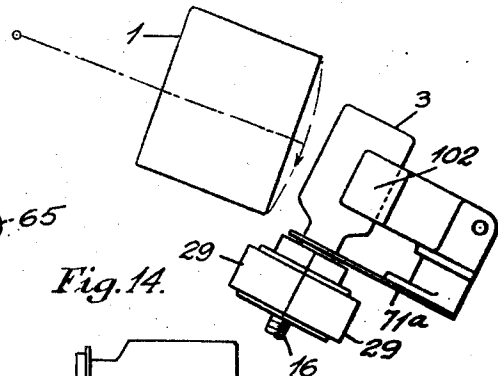


Fig. 14.

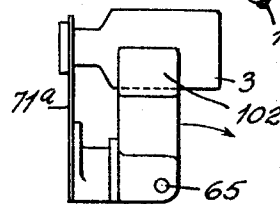


Fig. 13.

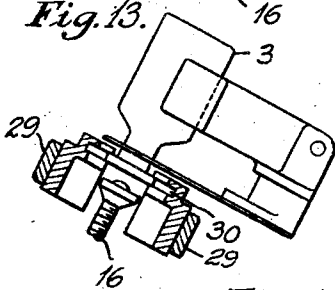


Fig. 15.

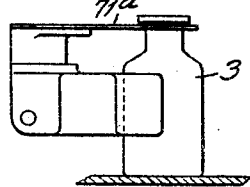
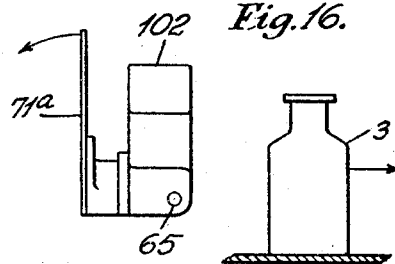


Fig. 16.



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UNITED STATES PATENT OFFICE.

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GLASSWARE-TRANSFERRING DEVICE.

Application filed August 25, 1925. Serial No. 52,344.

This invention relates to take-out devices for removing glassware from fabricating machines, and it has particular relation to devices for removing bottles or other glass articles in an inverted or neck-down position from the molds of a glass shaping machine, for reverting the articles and for depositing them at a suitable point of delivery, such as a conveyor or a setting-up buck.

One of the objects of the invention is to minimize shocks and jars to which articles of glassware may be subjected when removed from the molds of a glass shaping machine in an inverted position, reverted and transferred to a suitable point of delivery within the relatively short interval of time between the arrival of successive molds at the take-out station. We accomplish this object by providing separate mechanisms for performing certain of these operations, by reducing the rate of movement of the articles during their transfer from the molds to their point of delivery, and also by permitting the molds to revert, close and move on to the next station as soon as the ware is clear of the molds.

Another object of the invention is to provide a take-out device that will remove bottles of rectangular, oval or other non-circular cross section from the molds of a shaping machine and will deposit them on a conveyor or setting-up buck with their flat sides, or their major cross sectional dimensions in the case of oval ware, parallel to the edges of the conveyor.

Another object of the invention is to provide a take-out device that is relatively simple in construction and operation, and that is particularly adapted for use in connection with a shaping machine such as that described in the copending application for Letters Patent of Edward H. Lorenz, Serial No. 490,567, filed August 8, 1921.

In the accompanying drawings:

Figure 1 is a side elevational view of a take-out device constructed in accordance with the invention;

Fig. 2 is a plan view of the structure illustrated in Fig. 1;

Fig. 3 is an enlarged detailed view of the ware-removing mechanism;

Fig. 4 is a side view of the structure shown in Fig. 3, certain portions thereof being illustrated in vertical section;

Fig. 5 is a horizontal sectional view taken on line 5—5 of Fig. 4;

Fig. 6 is a horizontal sectional view taken on line 6—6 of Fig. 4;

Fig. 7 is a plan view of the reverting mechanism;

Fig. 8 is an enlarged view of the removing and reverting tongs mechanisms in the positions that these instrumentalities occupy in transferring ware from the former to the latter; and

Figs. 9 to 16 inclusive are diagrammatic views illustrating the several positions that the removing and reverting tongs mechanisms occupy while transferring an article from the mold to the point of discharge.

A bottle forming machine, such as that disclosed in the above-mentioned Lorenz application, includes a plurality of partible and invertible blow molds 1 which are carried by a rotating turret and which successively open at a take-out station to release the finished bottles while the bottles are in an inverted or neck-down position. Only one of these molds, with its cooperating bottom plate 2, is shown in the accompanying drawings.

Referring particularly to Figs. 1 and 2, the present take-out device includes a tongs mechanism A, which is adapted to remove a finished bottle 3 from the mold 1, while in an inverted position, and a tongs mechanism B to which the bottle is transferred and which reverts the bottle and delivers it to a conveyor or setting-up buck C in a right-side up position.

The tongs mechanism A comprises a carrier 4 which is mounted at its upper end between arms 5 which are pivotally mounted upon stud shafts 6. These shafts are fixed in a pedestal 8 which is carried by any convenient stationary support, such as the base 9 of the bottle-forming machine. The lower end of the carrier 4 is supported by a lever arm 10, which is pivotally mounted on a shaft 11. This shaft is journaled in bearings 12, which are provided on brackets 13 carried by the pedestal 8.

The carrier 4 is provided with upper and lower bearings 14 within which a sleeve 15 is mounted for vertical sliding movement. A steadying pin 16 is threaded into the upper end of the sleeve 15 for vertical adjustment and is maintained in its adjusted position by a lock nut 17. As best shown in Fig. 4, the steadying pin 16 is yieldably maintained in an elevated position by a coiled spring 18 which surrounds the sleeve 15 between the lower bearing 14 and a collar 19 which is fixed to the sleeve 15. The lower end of the sleeve 15 is provided with a slotted head 20 which limits the upward movement of the steadying pin 16 and to which the upper end of a link 21 is pivotally connected. The lower end of the link 21 is slotted, as indicated at 22, for sliding engagement with a pin 23 on an extension 24 of the lever 10.

The carrier 4 is also provided, at its upper and lower ends, with pairs of symmetrically arranged bearings 25 and 26, within which a pair of parallel vertical rock shafts 27 and 28 are respectively mounted. Each of the shafts 27 and 28 carries at its upper end one of a pair of co-acting tongs members 29, which are provided with complementary bottle-gripping recesses 30 at their outer ends. The shafts 27 and 28 are provided at their lower ends with abutting dogs 31 and 32 (Figs. 3 and 5), which cause the shafts to rock in unison when actuated to open or close the tongs 29. These tongs are yieldably urged towards each other by a spring 33 which surrounds the shaft 28 and which is connected at its lower end to the lower bearing 26, and at its upper end to a collar 34 which is fixed to the shaft 28. An adjustable stop 35 is provided on the shaft 27 for engagement with a lug 36 formed on the carrier 4, in order to limit the closing movement of the tongs 29.

The carrier 4 is urged towards its elevated position by a spring 37, acting through connections to be presently described, in order to raise the steadying pin 16 into yielding engagement with the neck of the bottle, to clamp the bottle against the bottom plate 2 while the mold is opening, and to also raise the opened tongs 29 to a position where they may grasp the bottle after the mold is opened. This spring 37, as shown in Fig. 1, is fixed at its lower end to a bracket 38 which is carried by the base 9 of the bottle-forming machine, and is attached at its upper end to a flexible connection 39 which passes upwardly and over, and is secured to, a segment 40 which is fixed to one of the lever arms 5. The upward movement of the carrier 4, and the parts mounted thereon, is limited by an adjustable stop 41 (Fig. 1) provided on the pedestal 8 for engagement by a lug 42 on the segment 40.

The upward movement of the carrier 4

under the action of the spring 37 is controlled by a cam 43 which is fixed to a shaft 44. This shaft may be rotated in any suitable manner but is preferably driven by the forming machine and in timed relation therewith. The cam 43 bears against a roller 45 which is carried by a rod 46 and which may be adjusted toward and away from the cam 43 by means of an eccentric stud 47, in order to determine the height to which the steadying pin 16 and the tongs 30 may be raised by a spring 37. One end of the rod 46 is bifurcated, as at 48, for supporting engagement with the shaft 44, and the other end thereof is pivotally connected to an arm 49 which is fixed to one of the arms 5.

The rotation of the shaft 44 is so timed that when an inverted mold 1 comes to rest at the take-out station, the low portion of the cam 43 permits the spring 37 to elevate the carrier 4 to the position shown in Fig. 1, in which the steadying pin 16 yieldably engages the neck of the bottle and holds the same against the bottom plate 2 while the mold is opening. During the time that the mold is opening, the roller 45 rides on a dwell 51 of the cam 43, but as soon as the mold has opened sufficiently for the tongs to enter between the halves thereof, an extreme low portion 52 of the cam 43, shown in dotted lines in Fig. 1, presents itself to the roller 45 and permits the spring 37 to elevate the carrier 4 still further, against the action of the spring 18. This additional movement of the carrier raises the tongs 30 between the opened section of the mold and into alignment with the neck finish of the bottle.

The tongs are held open by a bell crank lever 53, which is mounted on a stud 54 carried by the pedestal 8. One arm 55 of this lever is provided with a plate 56 which is adapted to engage a crank arm 57 which is fixed to the lower extremity of the shaft 27. The other arm 58 of the lever 53 is provided with a roller 59 for engagement with a cam lobe 60 which is carried by a disk 61 fixed to the shaft 44. The plate 56 is of sufficient length to bear against the crank arm 57 and hold the tongs open throughout the entire upward travel of the carrier 4.

As soon as the tongs reach the limit of their upward travel, the cam lobe 60 passes from engagement with the roller 59 and permits the plate 56 to recede and the crank arm 57 and the spring 33 to close the tongs into engagement with the ware.

By the time the tongs 30 securely grasp the neck of a bottle, the high portion 62 of the cam 43 bears against the roller 45 and forces the rod 46 to the right (Fig. 1), thereby rocking the lever arms 49 and 5 in a counter-clockwise direction, as viewed in Fig. 1 of the drawings, against the action

of the spring 37. This movement of the parts mentioned lowers the carrier 4 and the elements mounted thereon, and removes the fully blown bottle from the mold.

By reason of the fact that the arms 5 are considerably shorter than the arm 10, the arc of travel of the former is considerably greater than that of the latter, and as a result, the carrier is tilted to one side as it descends, and this movement serves to remove the bottle from the path of the mold parts as they invert and to present the bottle to the inverting mechanism B at an inclination to the vertical, as best shown in Fig. 8.

The inverting mechanism B comprises a housing 63 provided with trunnions 64 and 65 which are journaled in bearings 66 carried by off-set portions 67 of the brackets 13. Tong arms 68 and 69 are mounted on pivot pins 70 and 71 respectively, which are carried by the housing 63. A pair of co-acting tongs 71^a having complementary jaw members 72 are adjustably mounted on the forward ends of the arms 68 and 69 by bolt and slot connections 73, by means of which the tongs may be adjusted relative to the position occupied by the neck of the bottle when presented thereto by the removing mechanism A, in the manner described above.

The tongs are urged towards each other to yieldably grasp the ware by a spring pressed plunger 74 (Fig. 7), which is slidably mounted in the housing 63 and which engages a laterally extending lug 75 provided on the arm 68. This arm is provided with an adjusting screw 76 for engagement with an arm 77 which is also mounted on the pin 70. This arm is provided with a shoulder 78 which engages an arm 79 provided on the arm 69, and forces this arm in a clockwise direction, as viewed in Fig. 7, when the arm 68 is moved in a counter-clockwise direction under the action of the spring pressed plunger 74. The amount that the tongs 71 may be closed is regulated by means of an adjustable stop screw 80, which is threaded into the arm 69 for engagement with the arm 68. The arms 68 and 69 may be swung horizontally in order to accurately position the jaws 72 of the tongs relative to the neck of a bottle, by adjusting the screw 76, so as to shift the angular position of the arm 77 relative to that of the arm 68.

The tongs 71 are opened to receive and release the ware against the action of the plunger 74 by means of a bell crank lever 81 (Fig. 2), one arm 82 of which bears against a plunger 83 which extends coaxially through the trunnion 65 of the housing 63 and which, in turn, bears against an extension 84 of the arm 69 (Fig. 7). The other arm 85 of the bell crank lever 81 is connected by means of a rod 86 to an arm 87 of

a bell crank lever 88, which is mounted on the stud 54 above the bell crank lever 53 which controls the tongs of the ware-removing mechanism A. The other arm 89 of the lever 88 is provided with a roller 90 for engagement with a cam lobe 91 on the disk 61. The length of the rod 86 may be adjusted by means of a turnbuckle 86^a in order to regulate the amount that the tongs 71 may be opened or closed.

The reverting mechanism is urged towards the delivery position shown in Fig. 1 by means of a spring 92 (Fig. 1), which is secured at its lower end to the bracket 38, and at its upper end to a sprocket chain 93. This chain passes upwardly and over a sprocket wheel 94, which is fixed to the housing 63, and is secured to one arm 95 of a bell crank lever 96. The lever 96 is pivotally mounted on a shaft 97 which is journaled in bearings 98 carried by the base of the pedestal 8. The other arm 99 of the bell crank lever 96 is provided with a roller 100 for engagement with a cam 101 carried by the shaft 44.

A vertically adjustable rest 102 having a shape conforming to that of the side walls of the particular type of bottle being produced, is removably secured to the housing 63 and provides lateral support for the bottle both when the carrier 4 comes to rest at the end of its lowering and tilting movement, and also during the reverting operation.

The sequence of operations of the several parts of the device is as follows:

During the time that an inverted mold 1 is approaching the take-out station, the roller 45 is descending the low portion of the cam 43, permitting the carrier 4 to rise under the action of the spring 37. As soon as the mold comes to rest, the steadying pin 16 engages the neck of the bottle (Fig. 9) and clamps the bottle against the bottom plate 2 while the mold is opening. During this time the roller 45 is riding upon the dwell 51 of the cam 43, but as soon as the mold is opened, the extreme low portion 52 of the cam 43 presents itself to the roller 45 and permits the spring 37 to elevate the carrier still further. This additional movement of the carrier raises the tongs 30 between the open sections of the mold and into alignment with the finish of the bottle, and inasmuch as the movement of the steadying pin 16 is arrested through contact with the bottle, this additional elevation of the carrier compresses the spring 18.

During the upward travel of the carrier 4, the cam lobe 60 acts on the roller 59 to maintain the plate 56 in engagement with the crank arm 57 and the tongs are thus held open against the action of the spring 33, but as soon as the carrier 4 reaches the limit of its upward travel, the cam lobe 60 moves from engagement with the roller 59.

This permits the plate 56 to release the crank 57, and the spring 33 to close the tongs 30 into gripping contact with the neck of the bottle (Fig. 10).

5 The high portion 62 of the cam 43 now engages the roller 45 and forces the rod 46 to the right, as viewed in Fig. 1, which lowers and tilts the carrier 4 and the tongs 30, and thus removes the bottle from the mold. 10 The downward travel of the carrier 4 moves the pin 23 on the extension 24 of the arm 10 into abutting engagement with the lower end of the slot 22 and withdraws the steadying pin from engagement with the neck of the bottle, leaving the bottle entirely supported by the tongs 30.

At the beginning of the descent of the removing mechanism, the cam 101 engages the roller 100 and forces the arms 99 and 95 20 of the bell crank lever 98 in a clockwise direction (Fig. 1). This movement of the lever 98 causes the chain 93 to impart a rotary movement in a counter-clockwise direction to the sprocket wheel 94 against the 25 action of the spring 92. This movement of the sprocket wheel 94 swings the inverting mechanism B from the position shown in Fig. 1 to that shown in Figs. 8 and 11, and is timed to occur just before the removing 30 mechanism A reaches its lowermost position. As the removing mechanism A completes its downward travel, it carries the neck of the bottle between the opened jaws 72 of the tongs 71 and the body of the bottle into 35 supporting engagement with the rest 102 (Figs. 8 and 12). In this position the bottle is outside of the path of the mold 1, which may invert, close, and pass on to its next station, and sufficient clearance is provided for the next succeeding mold to advance to the take-out station.

During the movements described above, the cam lobe 91 has been in engagement with the roller 90 in order to maintain the tongs 45 71 in an open position against the action of the spring pressed plunger 74 through the medium of the bell crank lever 88, rod 86, bell crank lever 81 and plunger 83. As soon, however, as the neck of the bottle has been 50 positioned between the jaws 72 of the tongs 71, as above described, the cam lobe 91 passes from engagement with the roller 90, thus releasing the lever 88 and permitting the tongs 71 to be closed under the action of the 55 spring pressed plunger 74. The cam lobe 60 next releases the lever 58, permitting the tongs 30 to open and release the bottle under the action of the spring 33.

At this stage in the operation of the machine, the low portion of the cam 101 presents itself to the roller 100, and permits the spring 92 to rock the sprocket wheel 94 in a clockwise direction. This movement of the sprocket wheel 94 swings the tongs 71 65 upwardly and over to the position shown in

the full lines in Fig. 1, and transfers the bottle from the removing mechanism A to an upright position on the conveyor C. The cam lobe 91 now engages the roller 90 and actuates the bell crank lever 88, rod 86, bell 70 crank lever 81 and plunger 83 against the action of the spring pressed plunger 74, to open the tongs and release the ware.

It will be noted from an inspection of Fig. 2 of the drawings that the tongs 71 are disposed at an angle to their axis of swing and also that this axis is disposed at an angle 75 to the axis of swing of the removing mechanism. This particular construction is made necessary by reason of the fact that in molds designed for ware of rectangular cross section, the line of division between the sections of the mold occurs along the opposite vertical edges of the ware, and as a result, if the ware is transferred to the 85 buck or conveyor in a plane disposed at right angles to the conveyor, it will be deposited thereon with its flat sides disposed at an angle to the path of movement of the conveyor, as shown by dotted lines at *a* in 90 Fig. 2. Such an arrangement of ware on a conveyor is undesirable for several reasons, chief among which is that difficulty is encountered in shoving the bottles off from the buck to the lehr conveyor, more space 95 is occupied by the ware on the buck and in the lehr, and the ware is subjected to varying thermal conditions in the lehr occasioned by the proximity of the adjacent edges of the ware and the remoteness of the flat sides thereof. 100

By means of the present construction the inverting mechanism B imparts a one-eighth turn to the ware during its inversion and deposits it on the conveyor C with the flat 105 sides of the ware disposed parallel to the path of movement thereof.

While we have shown and described a take-out mechanism designed especially for handling bottles of rectangular cross-section 110 delivered by a shaping machine such as that disclosed in the above-mentioned Lorenz application, it will be understood that this mechanism may also be employed for handling ware of other shapes, and that the angularity and position of the axis of swing 115 of the inverting mechanism may be changed so as to deposit the ware on the conveyor in any desired position in accordance with the initial angular position of the ware in the mold and the relative angular position of the conveyor. In this and other respects the present take-out device may be modified 120 within the scope of the appended claims.

What we claim is:

1. In combination with a glass shaping mold, a take out device including means for removing ware from said mold and conveying it laterally a portion of the distance toward a delivery station, and means for re- 130

ceiving the ware from the first-mentioned means and conveying it the remainder of the distance to said delivery station.

2. In combination with the mold of a glass shaping machine, a take-out device including a pair of tongs mounted for movement about a horizontal axis for removing ware from said mold, and a second pair of tongs for receiving the ware from the first mentioned pair of tongs and inverting it.

3. In combination with a glass shaping mold, a take-out device including a pair of tongs for removing ware from said mold and a second pair of tongs for receiving the ware from the first mentioned pair of tongs and depositing it at a delivery station in a position angularly displaced with respect to its initial angular position in said mold.

4. In combination with a glass shaping mold, a take-out device including a pair of vertically swinging tongs for removing ware from said mold and a second pair of vertically swinging tongs mounted on an axis disposed at an angle to that of the first mentioned tongs for receiving the ware from said first mentioned pair of tongs and depositing it at a delivery station in a position angularly displaced relative to its initial angular position in said mold.

5. In combination with a glass shaping mold, a take-out device including a pair of tongs for removing ware from said mold and conveying it in a lateral direction a portion of the distance toward a delivery station and a second pair of tongs for receiving the ware from the first-mentioned pair of tongs and conveying it the remainder of the distance toward said delivery station.

6. In combination with an inverted glass shaping mold, a take-out device including a pair of tongs for removing ware from said mold, and a second pair of tongs for receiving said ware from the first mentioned pair of tongs and depositing it right end up at a delivery station and in a position angularly displaced relative to its initial angular position in said mold.

7. In combination with a glass shaping mold disposed in a neck-down position, a take-out device including a pair of tongs for removing ware from said mold and conveying it a portion of the distance toward a delivery station and away from the axis of said mold, and a second pair of tongs for receiving the ware from the first pair of tongs, inverting it and conveying it the remainder of the distance toward said delivery station.

8. In combination with a glass shaping mold disposed in a neck-down position, a take-out device including a pair of tongs for removing the ware from said mold and conveying it in a lateral direction a portion

of the distance toward a delivery station, and a second pair of tongs for receiving the ware from the first-mentioned pair of tongs, conveying it the remainder of the distance toward said delivery station and in a direction at an angle to the initial path of movement of the ware and depositing it in a neck-up position at said delivery station.

9. In combination with a glass shaping mold disposed in a neck-down position, a take-out device including a pair of tongs for removing ware from said mold and conveying it a portion of the distance toward a delivery station, and a second pair of tongs for receiving the ware from said first-mentioned pair of tongs, conveying it the remainder of the distance toward said delivery station and at an angle to the path of travel of said first-mentioned pair of tongs, and depositing the ware at said delivery station in a neck-up position and angularly displaced relative to its initial angular position in said mold.

10. In combination with an inverted sectional glass shaping mold for forming bottles of non-circular cross section, and a conveyor extending at an angle to the plane of the division between the sections of said mold, a take-out device including a pair of tongs mounted to swing about a horizontal axis for successively removing bottles from said mold, and a second pair of tongs mounted to swing about a horizontal axis disposed at an angle to that of said first-mentioned pair of tongs for receiving the bottles from said first-mentioned tongs and conveying them to said conveyor and depositing them thereon in a neck-up position and with a predetermined cross-sectional axis thereof disposed parallel to the direction of movement of said conveyor.

11. In combination with a glass shaping mold, a take-out device including tongs mechanism for removing ware from said mold and a second tongs mechanism movable in a plane at an angle to the plane of movement of the first tongs, for receiving the ware from said first-mentioned tongs and depositing it at a delivery station in a position angularly displaced relative to its initial angular position in said mold.

12. In combination with a glass shaping mold, a take-out device including tongs mechanism for gripping the ware, means for moving said tongs to invert said ware and means carried by said tongs mechanism for providing lateral support for said ware during the inverting operation.

Signed at Hartford, Connecticut, this 22nd day of August, 1925.

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