Nov. 13, 1928. 1,691,497

G. E. ROWE

TRANSFER DEVICE FOR GLASSWARE

Filed July 23, 1927

Fig. 1

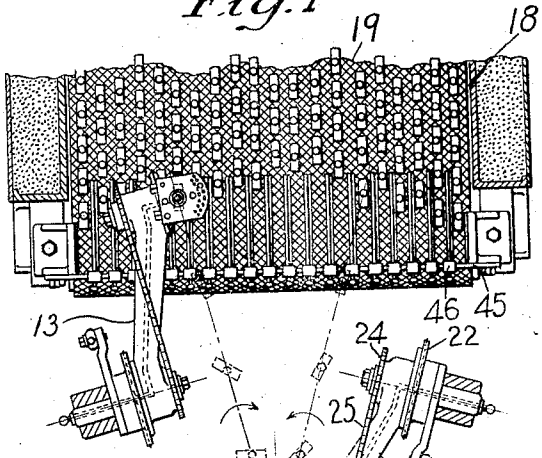


Fig. 4

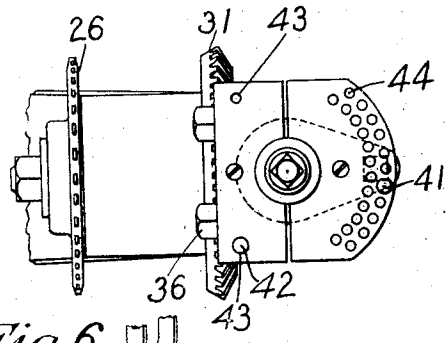


Fig. 6

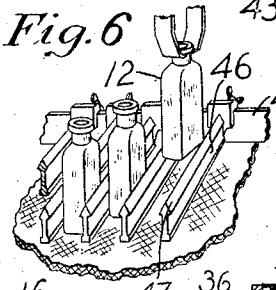


Fig. 3

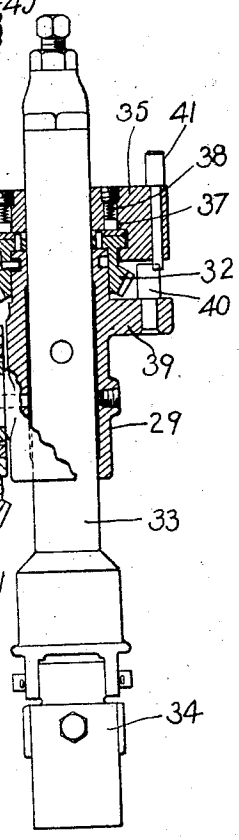


Fig. 5

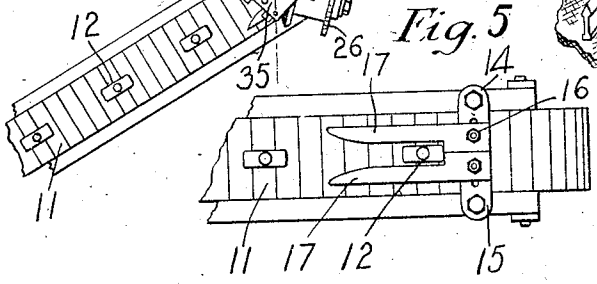
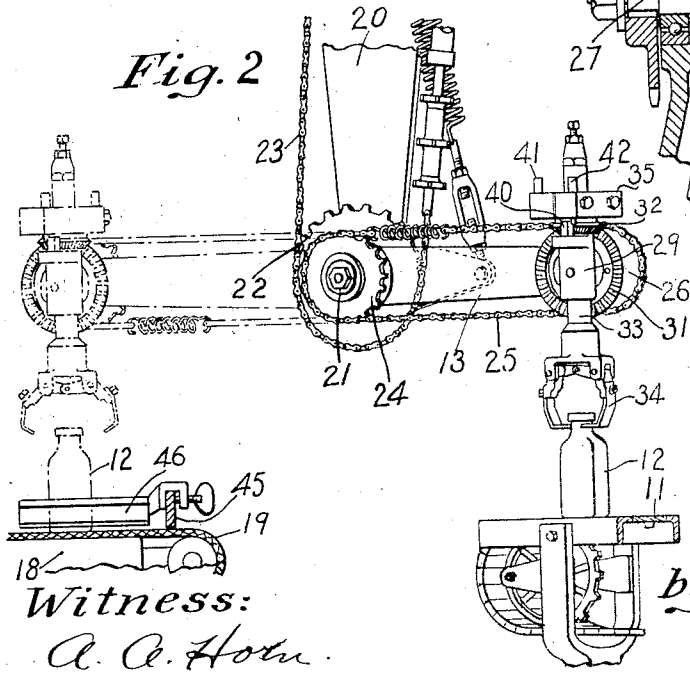


Fig. 2



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UNITED STATES PATENT OFFICE.

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TRANSFER DEVICE FOR GLASSWARE.

Application filed July 23, 1927. Serial No. 207,849.

My invention relates to glass-working machinery, and particularly to means for transferring from a receiving station to a conveyor or annealing lehr, such newly-made and unannealed glass bottles as have non-circular bottoms, one axis whereof is substantially greater than its transverse axis. As a large class of such bottles having rectangular bottoms and plain sides are commonly known as "panels", that term will be herein used as the generic name of all of the above-described glassware.

The invention is designed primarily as an improvement of or addition to an automatic glassware stacker, such as that disclosed in the U. S. application for Letters Patent of Edward H. Lorenz, Serial No. 204,875, filed July 11, 1927, although it is not necessarily confined in its uses to that stacker, but is suitable for use in any bottle transferring mechanism where it may be desirable to add to the movement of transfer, an additional rotary movement of the ware.

An object of the invention is to provide means associated with the transfer arms of an automatic transferring device or stacker, whereby "panels" picked up by the transfer device while they are in one angular position with respect to the center line of the lehr or conveyor upon which they are to be deposited after transfer, may be automatically turned about their vertical axes into a different angular position and deposited upon a lehr or conveyor in such new position.

Another object of my invention is to effect the operation of such means from the transferring movement of the transfer device.

Another object of the invention is to provide such a mechanism having means whereby the angle through which the ware is rotated may be selected and from time to time varied, whereby the device may readily function in the receipt of panels from bucks or conveyors differently disposed relative to the center line of the lehr conveyor on which the ware is to be deposited, without varying the angular position in which they are deposited on the lehr, or whereby the transfer device may be caused to deposit ware from a particular buck at different and selected angular positions with respect to the center line of the lehr.

Another object of my invention is to provide a rotating head for a transfer device or stacker, which may be turned by the transfer movement of the stacker to any selected extent, and which will always return to the same position on the return movement of the stacker, irrespective of the extent of its rotation on the transfer movement.

Another object of my invention is to provide guides associated with the lehr or receiving conveyor adapted to guide the bottles and to support them as they are deposited. Such a provision is of particular moment in the transferring of panels which are usually comparatively narrow, and if deposited on a conveyor which may be uneven or while the bottles retain any swinging movement which may have been imparted to them during transfer are apt to fall and to not only knock over other bottles already deposited, but to interfere with the deposit of future bottles on the lehr in such a manner as to cause breakage both of themselves and of the bottles later deposited.

Another object of the invention is to provide a "spotter" associated with the buck and stacker for presenting panels to the gripping tongs of the transfer arms in a particular and selected angular position with respect to the buck and the lehr.

Further objects will appear from the following specification and claims.

In the accompanying drawings:

Figure 1 is a plan view of one embodiment of my invention, showing the associated buck, stacker and lehr conveyor;

Fig. 2 is an elevation of part of the mechanism of Fig. 1, showing the buck, lehr and stacker arm, together with parts of its operating mechanism;

Fig. 3 is an enlarged elevation, partly in section, of a stacker head embodying my invention;

Fig. 4 is an enlarged plan view of the stacker head;

Fig. 5 is an enlarged plan view of the buck, showing the "spotter"; and

Fig. 6 is an enlarged view of a portion of the lehr conveyor equipped with the guides of my invention.

In the manufacture of glass bottles, the bottles as formed must be removed from the shaping machine and placed within an oven or lehr in which they may be annealed. In automatic installations, it has been the practice to provide a take-out of some well-known type to remove the formed bottles from the

shaping machine onto a conveyor or buck which carries they away from the shaping machine toward the lehr, and from which they are transferred to the lehr by some automatic transfer and stacking means.

To obtain the best results in the most economical manner, it is desirable that the newly formed bottles be moved to and through the lehr at a uniform and regular rate, and since in most lehr structures the temperature conditions therein depend very largely upon the heat in the bottles, it is desirable that the bottles be placed on the lehr as uniformly as possible, so that the heat conditions may remain constant when once properly adjusted. It is also obviously desirable to stack the ware in the lehr in a regular manner to best utilize the space on the lehr conveyor, and for other reasons.

In the usual full automatic installation, this is accomplished by suitably synchronized movements of the automatic shaping machine, the buck, the transfer and the lehr conveyor.

In the annealing of "panels" it is usually desirable that the bottle be placed on the moving lehr conveyor in a position in which the major axis of its bottom is parallel to the line of movement of the conveyor, as such a position reduces the chances of it being upset by the pull on the conveyor. Particular provisions are also desirable to assure that the panel is properly steadied during and immediately after its deposit on the conveyor, as its narrowness readily permits its upset if it is deposited on an uneven conveyor or while swinging, even very slightly, as the result of its transfer.

The conditions in the factory may and often do require that the panels be so deposited on the buck or the buck be so located relative to the lehr that if the bottles be transferred to the lehr by the usual means they will not be so desirably positioned and many difficulties in the management of the annealing process will follow.

The proper stacking of panels in the lehr is accomplished through the use of my invention, which corrects or obviates the conditions resulting from the necessity of locating the buck and lehr in relative positions determined by factory space, rather than by the desired cooperation of the two, and from the haphazard placing of the panel on the buck, either by the take-out or as the result of manual removal of bottles for weighing or inspection.

Broadly stated, my invention comprises (1) a spotter associated with the buck to assure that each bottle be presented at the transfer receiving station in the same angular position with respect to the center line of the buck; (2) a transfer head carried by the stacker and provided with ware gripping tongs, and which while being revolved about an axis to approach the lehr, is maintained in a vertical position and rotated about its vertical axis through a predetermined arc to bring the major axis of the bottom of the panel parallel to (or at any selected angle with) the center line of the lehr conveyor, and (3) guides at the delivery station on the conveyor to correct any tendency of the panel to rock and upset on its deposit and release from the tongs, these guides being made feasible by the predetermined angular position of each bottle at the time of deposit on the conveyor.

In the embodiment of my invention illustrated in the drawings, there is shown (Figs. 1 and 2) a buck 11 designed to receive bottles 12 from the take-out of a shaping machine and to advance them to a receiving station for an automatic transfer device or stacker, indicated as a pair of arms 13. As illustrated, each bottle 12 is of the "panel" type and is shown with the greater axis of its bottom parallel to the center line of the buck. The angular position of the bottles upon the buck, however, is not always uniform. The bottles are often displaced either during the take-out operation or because individual bottles are removed for weighing or inspection and then replaced haphazard upon the buck. To correct the angular position of misplaced bottles upon the buck and to assure that the bottle necks will be in the proper position for grasping by the tongs of the take-out mechanism, I provide on or adjacent to the buck a suitable guiding mechanism, such, for example, as the spotter 14, here shown as comprising a member 15 mounted on the stationary frame of the buck above the traveling portion thereof and carrying a pair of adjustable fingers 17 bolted thereto by bolts 16, in a position above the traveling portion of the buck and in the path of the glassware. These fingers are provided at their outer ends with beveled portions for guiding a displaced bottle to the transfer-receiving station and for correcting its angular position. The buck may be of any well-known type and may be driven either continuously or intermittently, but I prefer that the glassware is advanced by a step-by-step movement properly synchronized with the movement of the shaping machine and of the transfer device or stacker.

Adjacent to the delivery end of the buck is a lehr 18 in which the bottles are annealed, and which is preferably provided with a continuously moving conveyor belt 19. Such a lehr is illustrated in the United States Patent to V. Mulholland, No. 1,560,481.

Between the buck and the lehr is mounted a transfer device or stacker, preferably of the type set forth and described in the Lorenz application above-referred to, and more or less diagrammatically illustrated by the pair of symmetrical arms 13 (Fig. 1). This stacker consists of a suitable frame upon which is

mounted a carriage provided with a pair of downwardly projecting arms 20 (Fig. 2) on each of which one of the transfer arms 13 is mounted for rotation about a horizontal shaft 21. The carriage is also adapted for intermittent angular movement about a vertical pivot to provide for the lateral spacing of bottles delivered by the stacker to the lehr, each arm of the stacker being designed to cover by this intermittent movement one-half of the width of the lehr. The stacker to which reference is made is so designed that the arms 13 always return to pick up a bottle at a fixed single receiving station and to deliver the bottles to a plurality of delivery stations upon the lehr conveyor.

Each of the arms 13 of the stacker is mounted for pivotal movement about a horizontal shaft 21 carried by an arm 20, this movement being normally through 180 degrees from the receiving position to a delivery position on the lehr. A sprocket wheel 22, mounted on the hub about the shaft 20 formed at the pivoted end of the arm 13, carries a chain 23 which imparts a movement of oscillation to the arm 13 about the shaft 21. In the particular stacker referred to, the chain 23 is moved in one direction by a crank, and in the reverse direction by an air spring operating under the control of the crank.

The other end of the arm 13 forms a hub 30, provided with bearings 28 for a horizontal shaft 27 (Fig. 3). A sprocket wheel 24 is keyed to one end of the shaft 21 and carries a closed chain 25 which also passes around a sprocket wheel 26 which is keyed to one end of the shaft 27. The sprocket wheels 24 and 26 are similar, hence as the arm 13 revolves about the shaft 21, the shaft 27 is similarly revolved in its bearing 28. The opposite end of the shaft 27 carries a vertical bearing and supporting member 29 by which the tong-carrying and operating head 33 is carried. The member 29 is thus maintained in its vertical position at all times as the arm 13 is revolved about the shaft 21. The hub 30 carries a ring gear 31 constantly in mesh with a bevel gear on the lower end of a member 32 which is revolubly mounted upon the member 29. The head 33, carrying tongs 34 at its lower extremity, is rotatably mounted within the member 29 and carries at its upper portion a split member 35 designed to be clamped about the head 33 above the member 29 by bolts 36. The bevel gear member 32 is provided with an upper annular portion surrounding the head 33 and which loosely fits within an annular portion of the member 35. The upper surface of the gear member 32 is in frictional contact with projecting pins 37 mounted in the member 35 and forced toward the gear member by compression springs 38. It is thus apparent that as the arm 13 revolves about the horizontal shaft 20, the ring gear 31 imparts rotary movement to the gear 32 which, in turn, through the frictional engagement with the member 35, turns that member and the head 33 about its vertical axis.

The member 29 carries a projecting part 39 on which is mounted a stop 40 designed to contact with downwardly projecting pins 41 and 42 carried in holes provided in the member 35 to place predetermined limits on the rotating movement of the head 33. The pin 42 is designed to be set in one of the two holes 43 (dependent upon the mounting of the head on one or other of the arms) and determines the position of the head and the tongs at the receiving or pick-up station. The pin 41 is placed in one of a plurality of holes 44, and is designed to limit the angular movement of the head caused by the transferring movement of the transfer arm. While the beveled gear 32 is, during a transfer movement, always revolved by the ring gear 31 through an arc determined by the relative proportions of the ring gear and the bevel gear, the extent of movement of the head may be predetermined and varied through the positioning of the pins so that after a predetermined angular movement has been imparted to the head, the drive between the bevel gear 32 and the member 35 will slip and the rotary movement of the head be discontinued.

As the buck 11 may be placed, by reason of factory conditions, at any angle with respect to the center line of the lehr, it is desirable that the ring gear 31 and bevel gear 32 be so proportioned as to permit a maximum rotation of at least 90 degrees of the head 33 during the transfer movement of the arm 13, and these gears are preferably such that the bevel gear will rotate through a number of degrees which is an odd multiple of 90 during a single movement of the transfer arm. In the particular structure shown, the proportion of the gears is such that the bevel gear will rotate 270 degrees before the ring gear has moved through 180 degrees. It is obviously desirable that the rotary movement of the head cease before deposit of the bottle in the lehr.

At the receiving end of the lehr conveyor is provided a lateral bar 45 upon which are removably clamped spacing bars or members 46. These members are preferably beveled at the top edge, as shown at 47 (Fig. 6), to permit the easy deposit of panel bottles therebetween, and should be of sufficient height and so spaced as to correct any tendency of the panel bottles to fall upon their larger faces. They extend sufficiently far down the lehr conveyor to assure support to the panel until all vibratory movement of the bottles has ceased, and until the bottle has progressed from the receiving station so far that, if it then falls it will not interfere with the stacking of bottles at the receiving end of the lehr.

In the opertion of the devices described, the newly formed glassware is intermittently placed upon the buck by the take-out mecha-

nism or by hand, and is preferably moved by synchronized step-by-step movement toward the receiving station of the transfer device. Prior to arriving at this station, the ware which is displaced from its proper central or angular position is directed by the fingers 17 of the spotting device into correct angular position on the buck and is brought into and maintained at the receiving station by the device 14. In this position, it is picked up by the tongs of one of the arms 13 of the stacker, the tong fingers being at the time in a predetermined angular position with respect to the vertical axis of the head. As the stacker arm is moved from the receiving station to a delivery station on the lehr, the chain 25, moving about the fixed sprocket 24, revolves the sprocket 26 and thus maintains the head 33 always in a vertical position. The bevel gear 32 is moved over the fixed ring gear 31 and is revolved thereby. By reason of the frictional contact between the member 35 and the upper portion of the bevel gear, the member 35 is rotated with the gear and carries with it the head 33 and the bottle supported by the tongs revolving these parts around their vertical axes until the pin 41 contacts with the stop 40, whereupon the rotation of the head is stopped while the rotation of the bevel gear 32 continues. The bottle is then deposited in its predetermined angular position between a pair of the guides 46 upon the lehr conveyor 19 and released by the tongs. The ware, during its early movement through the lehr, is prevented from falling by the aforesaid guides 46.

The arm then returns for another bottle, the ring gear 31 revolving the gear 32 in the opposite direction. During this movement, the member 35 and head 33 are rotated until the pin 42 strikes the stop 40, arresting the movement of the head and causing slipping of the drive between the gear 32 and the member 35.

My invention may be readily applied to other forms of transfer devices than that shown and described, and the specific embodiment may be modified in structural details and arrangement without departing from the spirit of the invention.

I claim:

1. In a device for transferring glassware from a receiving station to a delivery station, means for gripping the ware, means for revolving it about a horizontal axis to transfer it from the receiving station to the delivery station, and means for rotating the ware about its vertical axis during such transferring movement.

2. In a device for transferring glassware from a receiving station to a plurality of ware delivery stations, a transfer arm, means carried by said arm for gripping the glassware, means for rotating the arm about a horizontal axis, and means operated by the movement of the arm about its horizontal axis to revolve the ware about a vertical axis.

3. In a transfer device for glassware in combination, rotating means for moving the ware from a receiving station to a delivery station, and other rotating means operated from the first named means for rotating the ware about an axis transverse to the axis of rotation of the first named means.

4. In an automatic transfer device for glassware in combination, a transfer arm mounted for oscillation about a horizontal axis and adapted to transfer glassware from a receiving station to a plurality of delivery stations, tong members carried by said arm and adapted to grip the ware to be transferred, means for maintaining the tong members and the ware gripped thereby during oscillation of the arm in positions parallel to their position at the receiving station, and means operative by the last-named means for rotating ware about its vertical axis.

5. In a glassware transferring device in combination with a transfer arm adapted to move about a horizontal pivot between a ware-receiving and a ware-delivery station, a revolvable head mechanism mounted on said arm and comprising a tong-carrying and operating mechanism, a bearing member adapted to revolve about a horizontal axis, gear members associated with the bearing member, a friction member driven by one of said gear members and connected to said tong mechanism, and means for maintaining the bearing member and tong members in vertical positions and for imparting rotary movement to the gears and friction member during the transfer movement of the arm.

6. In a transfer mechanism adapted to transfer glassware from a delivery station to receiving station, an oscillatory transfer arm, a transfer head including tongs adapted to grip the ware, means for maintaining the tong mechanism in vertical position throughout the movement of the transfer arm, means for rotating the tong mechanism about its vertical axis, and means for varying the extent of rotation of said tong mechanism during a transfer movement of the arm.

7. In a glassware transferring mechanism, an arm, means for rotating said arm about a horizontal axis, a tong-carrying head mounted at the extremity of said arm, said head comprising a member mounted for rotary movement about a horizontal axis, and a tong-carrying mechanism mounted in said last-named member for rotation about its longitudinal axis, means for rotating the first-named member, gearing actuatel by the rotation of said member to rotate the tong mechanism, and means for limiting the extent of rotation of said tong mechanism.

8. In a transfer device, a transfer arm mounted for rotation toward and from a ware-receiving station, a ware-gripping mech-

anism mounted at the extremity of said arm, means for maintaining the ware-gripping mechanism in positions parallel to its ware-receiving position during the transferring movements of the arm, a friction member attached to the ware-gripping mechanism and adapted for rotation about a vertical axis, gearing operated by movement of the transfer arm to rotate the friction member, and means associated with the head and with the friction member for rendering the gear mechanism ineffective to rotate the head after it has been rotated through a predetermined arc.

9. In combination, a buck for receiving newly formed glassware from a shaping machine and conveying it to a ware-receiving position, a spotter member associated with said buck for guiding the glassware to said delivery station in a predetermined angular position with respect to its vertical axis, a lehr having a continuously moving conveyor, a transfer device adapted to transfer glassware from the receiving station to a delivery station on the lehr conveyor, means for rotating the ware about its longitudinal axis in a predetermined arc during the transfer movement thereof, and means associated with the lehr and transfer device for guiding and supporting the ware during and immediately after its delivery on the lehr conveyor.

Signed at Hartford, Connecticut this 20th day of July, 1927.

GEORGE E. ROWE.