

Nov. 24, 1953

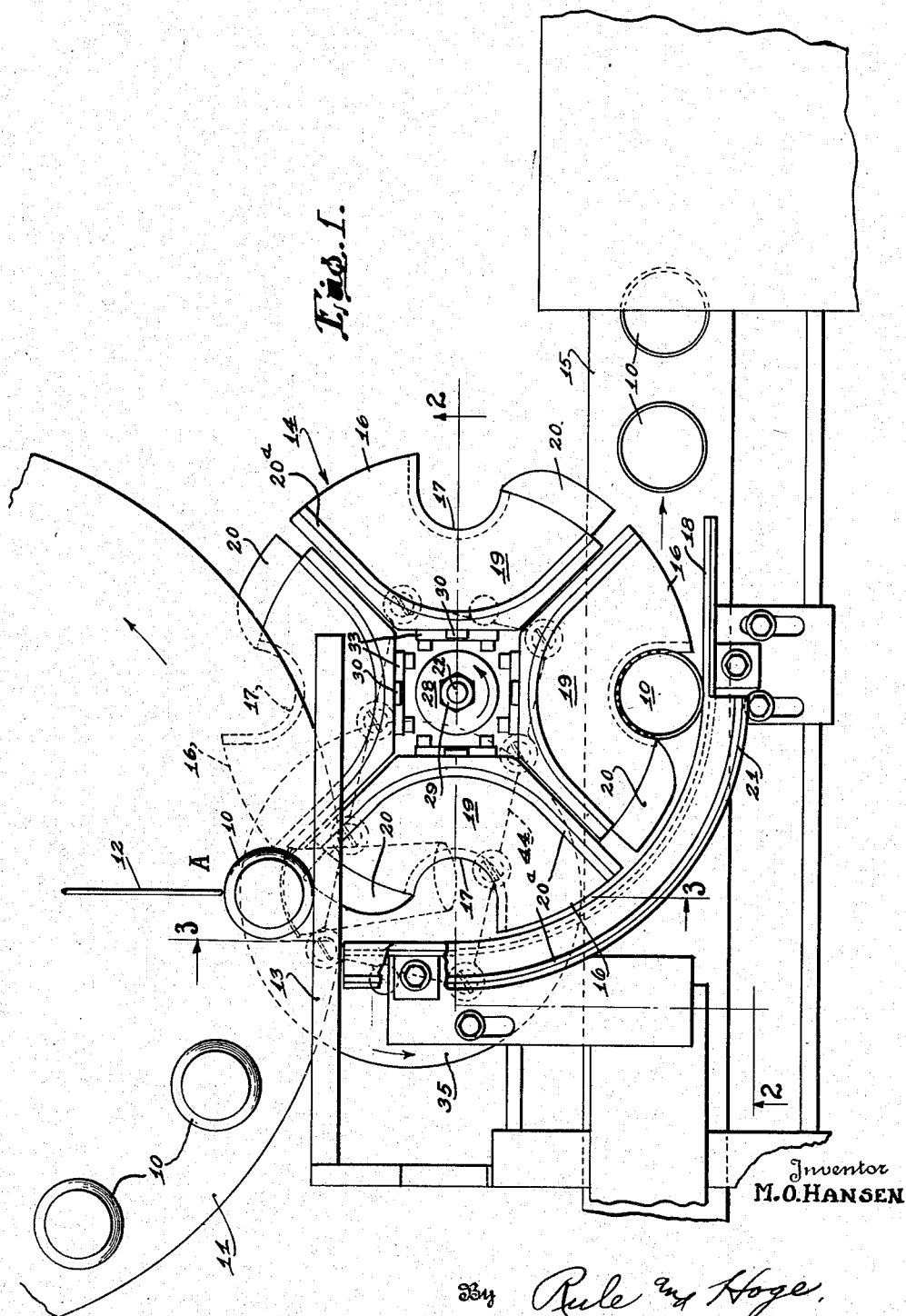
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2,660,288

ARTICLE HANDLING APPARATUS

Filed Feb. 16, 1951

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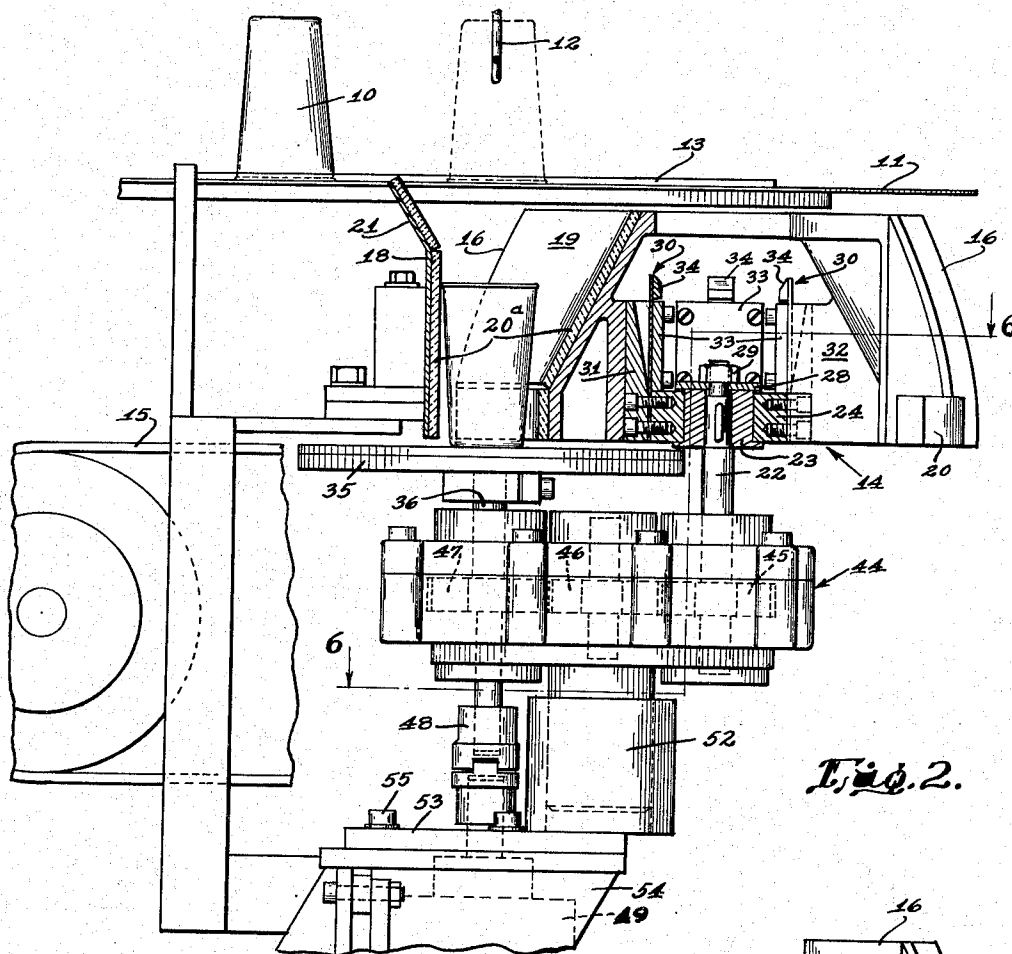


Fig. 2.

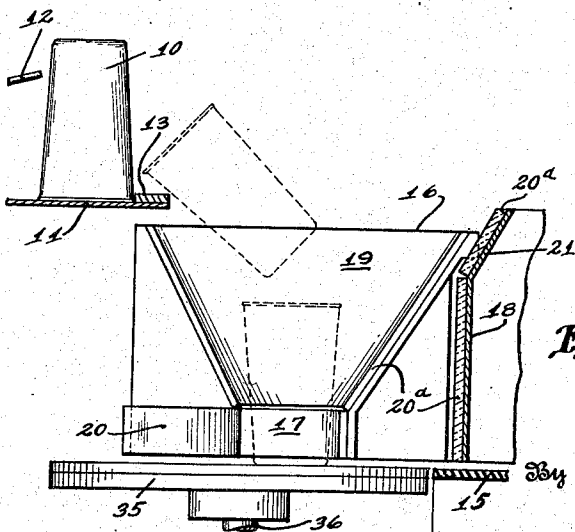


Fig. 3.

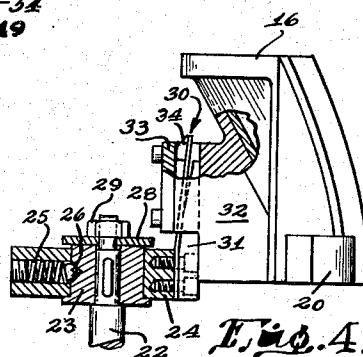


Fig. 4.

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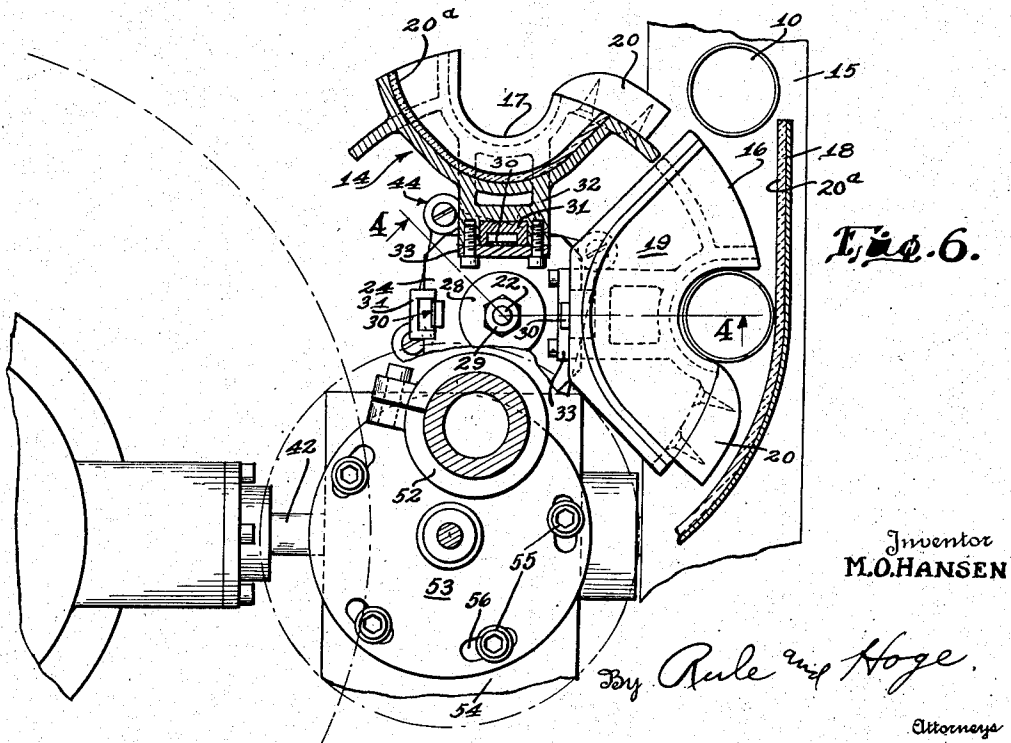
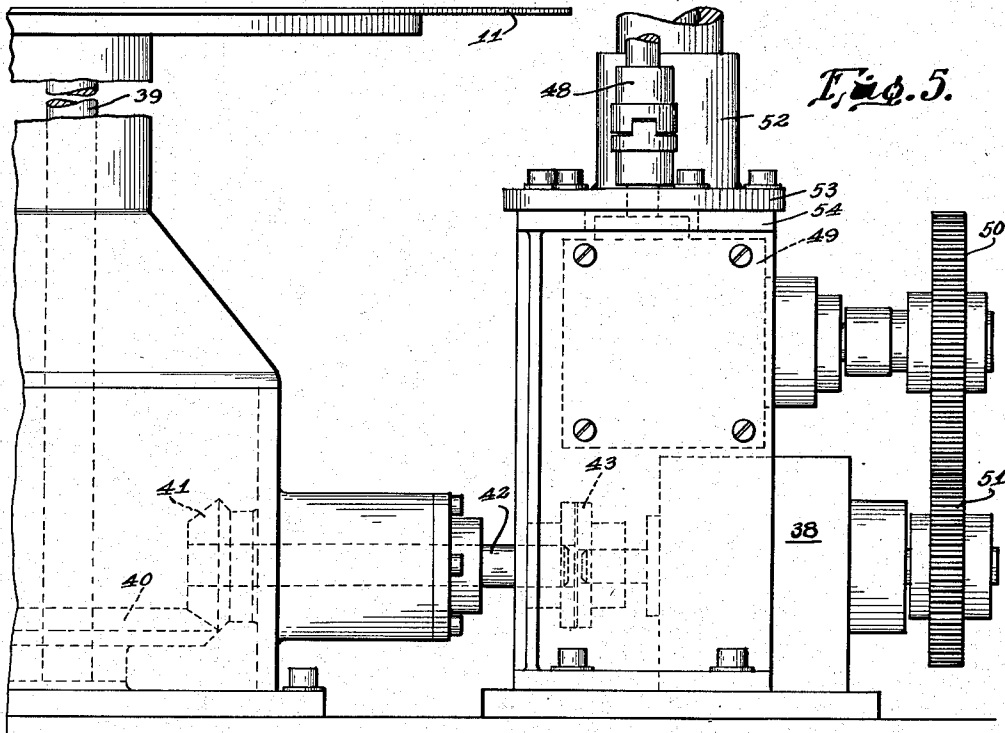
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UNITED STATES PATENT OFFICE

2,660,288

ARTICLE HANDLING APPARATUS

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10 Claims. (Cl. 198—33)

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This invention relates to article handling apparatus and particularly to apparatus for inverting tumblers which are discharged from a burn-off machine in bottom-up position and for subsequently transferring the tumblers to a cross conveyor by means of which the ware is conducted to the annealing Lehr.

In present day manufacture of glassware, molten glass is removed from tumblers in a suitable burn-off machine. In the usual embodiment, the tumblers are in an inverted position during this operation. It is therefore necessary to provide some suitable mechanism for bringing the tumblers to an upright position and transferring the tumblers to a cross conveyor by means of which the ware is conducted to the annealing Lehr.

In such an apparatus, it is essential that the tumblers, which are at a fairly high temperature, be inverted without distorting the shape thereof and without marking or disfiguring the interior surface thereof. Moreover, it is necessary that the tumblers be positively positioned and spaced on the cross conveyor in order that they may be properly transferred to the Lehr. A further requirement of the apparatus is that it be capable of clearing itself in case a tumbler breaks or several tumblers are inadvertently at the uprighting station at the same time.

It is therefore an object of this invention to provide an apparatus for uprighting the tumblers and transferring them to a cross conveyor without distorting the shape thereof or marking or disfiguring the interior surfaces thereof.

A further object of this invention is to provide such an apparatus whereby the tumblers will be positively positioned and spaced on the cross conveyor.

It is a further object of this invention to provide such an apparatus which will clear itself in its normal operation.

Other objects of the invention will appear hereinafter.

Referring to the accompanying drawings:

Fig. 1 is a plan view of the uprighting and transferring mechanism;

Fig. 2 is a part sectional elevational view substantially along the line 2—2 on Fig. 1;

Fig. 3 is a sectional view at the line 3—3 on Fig. 1;

Fig. 4 is a sectional view at the line 4—4 on Fig. 6;

Fig. 5 is an elevational view of the lower portion of the apparatus showing the driving connections; and

Fig. 6 is a sectional view substantially along the line 6—6 on Fig. 2.

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Basically, my invention comprises means for bringing the inverted tumblers to an uprighting station, means for pivoting the tumblers one at a time about their rim or bead and causing them to fall freely, means for guiding the freely falling tumblers to a lower level, and means for spacing the tumblers on a cross conveyor.

Referring to Figs. 1 and 2, the tumblers 10, after leaving the burn-off machine (not shown) are delivered in rapid succession to a circular table 11 which is continuously rotated about its axis, the tumblers being placed in an inverted position on the table 11. The table carries the inverted tumblers 10 to an uprighting station A. At the uprighting station, a stream of air under pressure emanates continuously from a pipe 12, and a horizontal bar 13 is positioned tangent to the table 11. As a tumbler 10 is brought into position before the pipe 12, the air forces the tumbler against the bar 13 and causes it to be pivoted about the bar and to fall freely, as shown by the dotted lines in Figs. 1 and 3.

Cup mechanism 14 is provided for guiding the freely falling tumblers to an upright position and spacing the uprighted tumblers on a horizontally travelling cross conveyor 15. As seen from above in Fig. 1, this cup mechanism 14 is substantially circular in outline and is composed of a series of cup units 16, herein shown as four in number. Each of these units includes an open semi-cylindrical pocket 17 with vertical walls, into which pocket a freely falling tumbler is guided. Each of the cup units 16 also includes a guiding section or chute 19 having an inclined, downwardly convergent guiding surface for guiding the freely falling tumbler into the pocket 17. This guiding surface 19 extends upwardly from said pocket 17 in a conical fashion as shown in Figs. 1, 2 and 3. A stationary wall comprising a vertical wall section 18 is extended in an arc along the periphery of the mechanism 14 to aid in guiding the tumblers during their uprighting movement and during their movement to the conveyor 15 while supported in the pockets 17.

As shown in Fig. 2, the stationary wall includes an inclined portion 21 extending along the upper edge of the vertical wall section 18 for aiding in guiding the freely falling tumblers into the pockets 17. The inclined portion 21 extends upwardly to substantially the level of the table 11. Each of the cup units 16 is also provided with a camming block 20 adjacent to the pocket 17 which aids in positively ejecting the uprighted tumbler from the pocket 17 onto the cross conveyor 15.

The surfaces of the metal cup unit 16, with which the hot tumblers come in contact, and the

vertical wall 18, are covered with a layer of insulating material 28* (Fig. 6) such as asbestos, to prevent breakage of the hot ware due to the sudden cooling which might result if the ware were allowed to come into contact with cold metal surfaces. The asbestos also serves as a cushioning member.

The cup units 16 are mounted for rotation on a vertical shaft 22 (Figs. 2, 4). The units are mounted as presently described so that each may be quickly and easily removed and replaced. A collar 23 is keyed to the vertical shaft 22 and a mounting ring 24 is slipped over said collar. As shown in Fig. 4, the mounting ring 24 is held in position by a spring 25 and ball 26 acting on detent in the form of a recess in the collar 23. Such a spring, ball, and detent arrangement is provided at equally spaced points around the periphery of the mounting ring 24, and is a safety precaution to permit slippage of the cup mechanism 14. A plate 28 and a nut 29 are provided to retain the collar 23 in a vertical position on the shaft 22.

Resilient spring-type clips 30 and wedge-shaped mounting bars 31 are bolted on the mounting ring 24 and extend upwardly therefrom. Referring to Figs. 2, 4, and 6 it may be seen that each of the cup units 16 is provided with an integral U-shaped mounting bracket 32 over which a plate 33 is bolted, providing a space between the bracket and plate. The unit 16 is mounted (as shown in Fig. 4) by moving it downwardly over the clip 30 and mounting bar 31, the clip and mounting bar extending through the space between the bracket 32 and plate 33. The clip 30 is provided with a tab 34 which snaps over the plate 33 to retain the cup unit 16 in position.

As shown in Figs. 1 and 2, a constantly rotating disc 35 mounted on a shaft 36 is provided below the cup units to serve as a bottom plate against which the bottoms of the tumblers are retained as they are carried along to the cross conveyor. This disc 35 is rotated as shown, in a counterclockwise direction in order to apply a force to the bottoms of the tumblers toward the axis of the carrier 14 and thereby aid in retaining the tumblers in the pockets.

As shown in Fig. 5, the various parts of the mechanism are driven by a motor 38. The circular table 11 is rotated through a driving connection to the motor 38, the driving connection comprising shaft 39, bevel gears 40, 41, and shaft 42, and coupling 43.

The cup mechanism 14 and rotating disc 35 are rotated by the motor 38 through driving connections which include gearing within a gear box 44 (Fig. 2) comprising a gear 45 on the shaft 22, an idler gear 46, and a gear 47 on the shaft 36. A coupling 48 connects the shaft 36 with gearing in a second gear box 49 and gears 50 and 51 (Figs. 2, 5).

The cup mechanism 14, disc 35, and gear box 44 are supported on a short column 52 resting on plate 53 which in turn is bolted to base 54 by bolts 55 extending through elongated openings 56. The entire mechanism may be adjusted relative to the table 11 and cross conveyor 15 by rotating the plate 53 relative to the base 54.

The operation of the mechanism may be summarized as follows:

After leaving the burn-off machine, the tumblers 10 are placed in an inverted position on the rotating table 11 which carries the tumblers in front of the pipe 12. As a tumbler is carried into position before pipe 12, the air emanating

under pressure from the pipe 12 forces the tumbler against the bar 13 and causes it to be pivoted or tipped over the bar and fall freely. The freely falling tumbler is guided downwardly into the pocket 17 by the inclined conical surface 19 and the inclined surface 21 on the vertical wall 18. The tumbler is then carried along in the pocket 17 and positioned on the cross conveyor 15. The cam block 20 aids in this positioning step by forcing the tumbler against the wall 18 and further insuring the transfer to the cross conveyor 15.

The tumbler, after being uprighted, is retained in the pocket 17 during its movement toward the conveyor 15, by the force applied to the bottom of the tumbler by the rotating disc 35.

Each tumbler will vibrate or bounce upon having its free fall stopped at the lower level. However, sufficient time elapses during the movement of the tumbler to the cross conveyor, so that the vibration or bouncing has stopped by the time the tumbler reaches the cross conveyor. This insures that the tumblers are accurately positioned and spaced on the cross conveyor and therefore provides an important advantage of the mechanism.

The speed of rotation of the cup mechanism 14 is such that a cup unit 16 is brought to the uprighting station in time to receive the freely falling tumbler. However, the uprighting operation will be equally effective even if the tumbler has become displaced on the table 11 and is caused to fall freely downward before a pocket 17 is in perfect alignment; the guiding surfaces will nevertheless guide the tumbler into the pocket.

If a tumbler becomes broken, the pieces will not jam the mechanism but will be carried away and swept aside by the pockets 16 without any interruption of the operation.

The air emanating from the pipe 12 is preferably applied continuously but may be applied intermittently.

It can be seen that the mechanism described provides an apparatus for uprighting tumblers and positively positioning and spacing them on conveyors without distorting the shape thereof and without marking or defacing the interior surfaces thereof. The apparatus does not necessitate accurate positioning of the tumblers before transfer of the tumblers thereto. The apparatus is simply constructed, occupies very little space, and is also self-clearing.

Modifications may be resorted to within the spirit and scope of the appended claims.

I claim:

1. The combination comprising a horizontal circular table mounted for rotation about its axis for successively bringing inverted tumblers, positioned thereon along its periphery, to an uprighting station, a horizontal bar tangent to said table at the uprighting station, means for forcing each tumbler against said bar as it is brought to the uprighting station and causing it to be pivoted about said bar and fall freely, a horizontal rotating disc at a lower level than said circular table and in the vicinity of the uprighting station, a horizontally traveling conveyor adjacent to the rotating disc and at the same level as said rotating disc, means for guiding each said freely falling tumbler onto the rotating disc and then moving said tumbler along said disc to the conveyor and positioning it thereon.

2. The combination comprising a horizontal circular table mounted for rotation about its axis for successively bringing inverted tumblers, posi-

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tioned thereon along its periphery, to an uprighting station, a horizontal bar tangent to said table at the uprighting station, means for supplying air under pressure against the upper part of each tumbler as it is brought to the uprighting station and thereby forcing each tumbler against said bar and causing it to be pivoted about said bar and fall freely, a horizontal rotating disc at a lower level than said circular table and in the vicinity of the uprighting station, a horizontally traveling conveyor adjacent to the rotating disc and at the same level as said rotating disc, means for guiding each said freely falling tumbler onto the rotating disc and then moving said tumbler along said disc to the conveyor and positioning it thereon.

3. The combination set forth in claim 2, said means for guiding, moving, and positioning the tumblers comprising a vertical wall extending in an arcuate manner from the uprighting station to the conveyor, the upper end of said wall being substantially on a level with the circular table and the lower end of said wall being substantially on a level with the disc, and a cup mechanism having a circular configuration and mounted for rotation about a vertical axis, said cup mechanism being concentric with and having substantially the same radius as the vertical wall, said mechanism comprising semi-circular pockets in the periphery thereof into each of which a tumbler is guided as it falls and by which each tumbler is moved to the conveyor and positioned thereon, the cup mechanism including an inclined surface extending from the upper edge of each of said pockets for guiding a freely falling tumbler into each of said pockets.

4. The combination set forth in claim 2, said means for guiding, moving and positioning the tumblers comprising a vertical wall extending in an arcuate manner from the uprighting station to the conveyor, the upper end of said wall being substantially on a level with the circular table and the lower end of said wall being substantially on a level with the disc, and the cup mechanism having a circular configuration and mounted for rotation about a vertical axis, said mechanism being concentric with and having substantially the same radius as the vertical wall, said mechanism comprising semi-circular pockets in the periphery thereof into each of which a tumbler is guided as it falls and by which each tumbler is moved to the conveyor and positioned thereon, the cup mechanism including an inclined surface extending in a conical fashion from the upper edge of each of said pockets for guiding a freely falling tumbler into each of said pockets.

5. The combination set forth in claim 2, said means for guiding the tumblers comprising a series of open cups mounted for rotation about a vertical axis, guiding surfaces extending upwardly from said cups for guiding a freely falling tumbler into each of said cups as the cups are successively brought to the uprighting station, and a vertical wall extending along a portion of the path of said cups.

6. The combination comprising a horizontal circular table mounted for rotation about its axis for successively bringing inverted tumblers, positioned thereon along its periphery, to an uprighting station, a horizontal bar tangent to said table at the uprighting station, means for forcing each tumbler against said bar as it is brought to the uprighting station and causing it to be pivoted about said bar and to fall freely, a horizontal plate at a lower level than said circular

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table and partially underlying said circular table, a horizontally traveling conveyor adjacent to the plate and at the same level as said plate, means for guiding said freely falling tumbler onto the plate and then moving said tumbler along said plate to the conveyor and positioning it thereon.

7. The combination comprising a horizontal circular table mounted for rotation about its axis for successively bringing inverted tumblers, positioned thereon along its periphery, to an uprighting station, a horizontal bar tangent to said table at the uprighting station, means for supplying air under pressure against the upper part of each tumbler as it is brought to the uprighting station and thereby forcing each tumbler against said bar and causing it to be pivoted about said bar and fall freely, a horizontal rotating disc at a lower level than said circular table and in the vicinity of the uprighting station, a horizontally traveling conveyor adjacent to the rotating disc and at the same level as said rotating disc, means for guiding each said freely falling tumbler onto the rotating disc and then moving said tumbler along said disc to the conveyor and positioning it thereon, comprising a vertical wall extending in an arcuate manner from the uprighting station to the conveyor, the upper end of said wall being substantially on a level with the circular table and the lower end of said wall being substantially on a level with the disc, and the cup mechanism having a circular configuration and mounted for rotation about a vertical axis, said mechanism being concentric with and having substantially the same radius as the vertical wall, said mechanism comprising semi-circular pockets in the periphery thereof into each of which a tumbler is guided as it falls and by which each tumbler is moved to the conveyor and positioned thereon, the cup mechanism including an inclined surface extending in a conical fashion from the upper edge of each of said pockets for guiding a freely falling tumbler into each of said pockets and means mounted adjacent to each of said pockets for contacting the tumbler as it is positioned on the conveyor and transmitting a positive movement thereto to insure its being properly positioned on the conveyor.

8. Apparatus for transferring tumblers or like articles comprising a generally circular transfer element mounted for rotation horizontally about its axis, said element comprising downwardly and outwardly inclined guiding walls terminating at their lower ends in semi-cylindrical pockets opening outwardly at the periphery of said element, means for dropping the said articles in succession onto said guiding surfaces and causing said articles to move downwardly into said pockets, a horizontal traveling conveyor extending beneath said pockets into position to provide a support for the articles while the latter are in said pockets, means for rotating said transfer element, and means for guiding and forcing the articles out of said pockets and leaving them in upright position on the conveyor.

9. The combination set forth in claim 8, said last mentioned means comprising cam blocks carried by said transfer element and extending rearwardly from said pockets.

10. Apparatus for transferring tumblers and other articles comprising a transfer element mounted for rotation about a vertical axis and formed in its peripheral portions with outwardly opening pockets, means for rotating the transfer

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element about its vertical axis and thereby bringing the said pockets in succession to a receiving station, means for dropping the articles in succession to said transfer element and guiding them into said pockets, a traveling conveyor extending horizontally beneath and adjacent to a portion of the transfer element at a position beyond the said receiving station, means for rotating said element, means for dropping the said articles into said pockets singly and in succession, a horizontal disc mounted for rotation about its vertical axis, said disc being at substantially the same level as said conveyor and positioned intermediate the conveyor at said station, the conveyor being tangent to the disc, said disc forming a bottom support for the articles during a

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portion of their travel with the transfer unit, and means for rotating the disc in a direction to hold the said articles within said pockets while supported on the disc.

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