April 30, 1935. A. J. SMITH 1,999,742

GLASSWARE TAKEOUT MECHANISM

Filed July 20, 1932 2 Sheets-Sheet 1

Fig. 3.

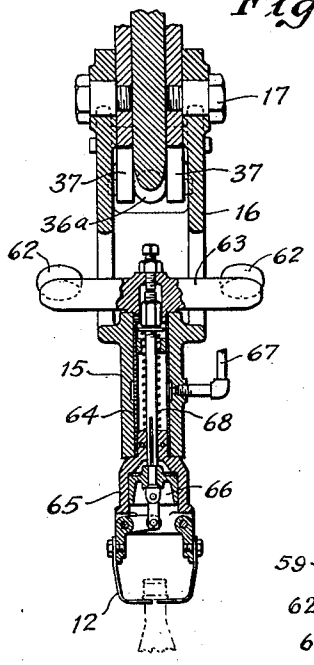
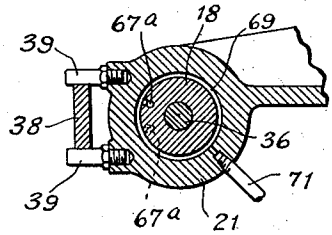


Fig. 1.

Fig. 5.



Witness:
A. A. Horn

Inventor
Algy J. Smith
by Burns & Parlan
Attorneys.

April 30, 1935. A. J. SMITH 1,999,742

GLASSWARE TAKEOUT MECHANISM

Filed July 20, 1932 2 Sheets-Sheet 2

Fig.2.

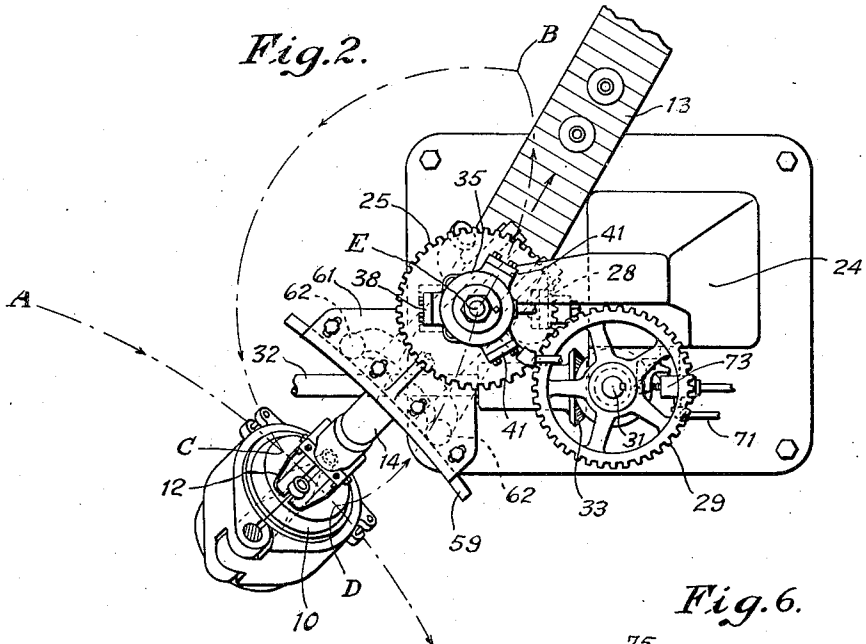


Fig.6.

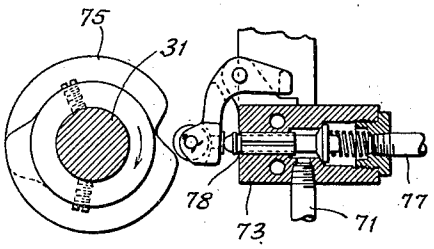


Fig.4.

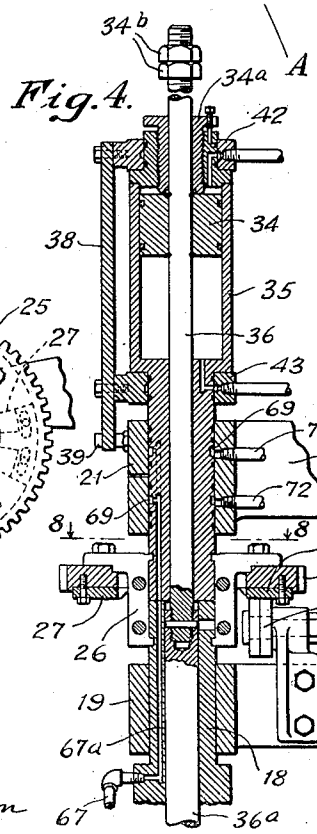


Fig.8.

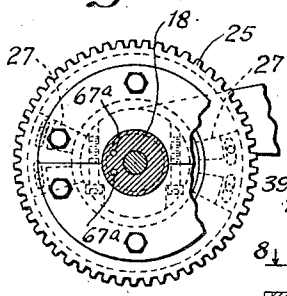
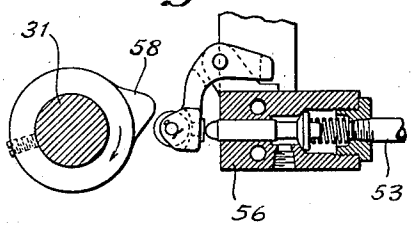


Fig.7.



Witness:
A. A. Horn

Inventor
Algy J. Smith
by Brumbaugh
Attorneys.

Patented Apr. 30, 1935 1,999,742

UNITED STATES PATENT OFFICE

1,999,742

GLASSWARE TAKEOUT MECHANISM

Algy J. Smith, Bloomfield, Conn., assignor to Hartford-Empire Company, Hartford, Conn., a corporation of Delaware

Application July 20, 1932, Serial No. 623,490

6 Claims. (Cl. 214—1)

This invention relates to mechanism for taking out glassware from the finishing molds of a glassware forming machine, particularly the type in which the molds are held in inclined position during the discharge of ware therefrom, as for example the Owens suction machine.

Heretofore, the customary practice in discharging ware from such machines has been to open the molds, permitting the ware to tip over and fall freely by gravity into a chute or other receiver.

But this manner of discharging the ware from the machine may result in injury to the ware; it may become scratched and perhaps even deformed as a result of dropping on its side—if allowed to rest on its side it might be locally chilled to an extent sufficient to set up harmful strain in the ware. Furthermore, this free discharge of the ware makes automatic stacking of the ware in the lehr almost impossible, or at least impracticable.

The general object of this invention is to provide a novel automatic takeout mechanism for removing the ware from inclined finishing molds, this mechanism being of relatively simple construction, but adapted to remove the ware positively and place it bottom-down on a conveyor in predetermined sequence and with a minimum risk of injury to the ware.

A more specific object of the invention is to provide a novel mechanism of the above character which may comprise a pair of arms, each carrying a pair of tongs, and being moved alternately in the path of inclined finishing molds for the removal of the ware and into a position for the delivery of the ware in vertical position to a conveyor or other receiver. As one pair of tongs is moved with a mold, the other pair may deliver ware to the conveyor, this permitting removal of ware at high speed. The tongs may be adapted to handle a plurality of articles in each operation, which is very advantageous in taking out ware from plural cavity mold units. The tongues also may be moved upwardly periodically to raise the ware from the bottom plates of the finishing molds.

In order that the invention may be better understood and its various advantages appreciated, reference should be had to the accompanying drawings, in which a convenient embodiment thereof is illustrated.

In said drawings:

Figure 1 is a developed view of takeout mechanism embodying the invention, in which parts which are in fact angularly related, as shown in Fig. 2, are shown in front elevation as if not angularly related, for convenience in illustration;

Fig. 2 is a view in top plan of the mechanism of Fig. 1, and illustrating the angular relation of the parts shown as if parallel in Fig. 1;

Fig. 3 is a view in vertical transverse section of a lower portion of the tongs mechanism, and taken substantially on the line 3—3 of Fig. 1;

Fig. 4 is a view similar to Fig. 3, but taken at right angles thereto and showing structure directly above that in Fig. 3;

Fig. 5 is a detail view in horizontal section taken substantially on line 5—5 of Fig. 1;

Figs. 6 and 7 are detail views in horizontal section taken on lines 6—6 and 7—7 respectively of Fig. 1, and showing valve mechanism; and

Fig. 8 is a similar view taken on line 8—8 of Fig. 4.

Considering the drawings in detail, a finishing mold 10 is shown in the inclined position which it assumes for the discharge of ware therefrom and while traveling in a circular path as indicated by the line A—A. The mold 10 may be of the plural cavity type, such as is commonly used on the Owens suction machine, it being understood that said mold is one of a large number which periodically pass through the takeout zone for the discharge of glassware.

From such molds, the ware may be removed by the mechanism of this invention which may comprise two pairs of grippers 11 and 12 respectively, which operate alternately for this purpose and place the ware in pairs on a belt conveyor 13 or other receiver, for transportation to the lehr. To accomplish this, the tongs may be caused to travel in an orbital path, such as is indicated at B C D E in Fig. 2, to which end they are mounted on the downwardly diverging arms 14 and 15 of a carrier 16 pivoted at 17 on a rotary and reciprocatory sleeve 18. The sleeve or tubular shaft 18 is formed in two parts, and is journaled in bearings 19 and 21 in vertically spaced arms 22 and 23 on pedestal 24.

It will be understood that rotation of sleeve 18 serves to revolve or rotate the tongs, and for this purpose, the sleeve carries a spur gear 25 bolted to a two-part coupling 26 which joins the two parts of the sleeve. Gear 25 carries two cams 27 on its under side which periodically ride over a stationary roller 28 on arm 22 to raise and lower the tongs at appropriate times, and for the purposes hereinafter described.

Said gear is driven by a similar gear 29 on the upper end of a vertical cam shaft 31 in turn driven by horizontal shaft 32 through bevel gears 33, 33*a*. Shaft 32 is connected to a suitable driving means, not shown.

As carrier 16 is rotated, the tongs are caused to travel in the desired path by the oscillation of carrier 16 on pivot 17, and by the rotary or oscillatory movements of each pair of tongs in its arm 14 or 15. Oscillation of carrier 16 is caused primarily by the reciprocation of piston 34 in

cylinder 35 formed on the upper part of sleeve 18. Piston 34 actuates rod 36, formed in two parts for convenience in assembling, the lower part 36a of which is bent upwardly in a right angle and joined by links 37 to a lug on carrier 16. When the piston is down, tongs 11 are held outwardly in inclined position and revolved rapidly while the tongs 12 are held inwardly and rotate slowly axially of sleeve 18 and in horizontal position over conveyor 13, and vice versa.

The stroke of the piston 34 may be varied by a nipple 34a adjustable in the top of cylinder 35, and by nuts 34b on the upper end of piston rod 36.

Cylinder 35 both rotates and reciprocates with sleeve 18, being steadied in its movements by a vertical guide 38 which extends and slides between lugs 39 on bearing 21, said guide together with strips 41 holding bearings 42 and 43 for the cylinder in vertically spaced relation.

The reciprocation of piston 34 is effected by the admission and exhaust of fluid pressure to and from the opposite ends of cylinder 35 through conduits 44 and 45 which communicate with the cylinder through the bearings 42 and 43. These conduits have adjustable check valves 46 therein for regulating and cushioning the stroke of the piston, which is under the primary control of a pneumatic piston valve 47 having an inlet pipe 48 for live air and exhaust ports 49 for the release of air from said conduits.

From pipe 48 live air escapes through bleed duct 51 in the piston 52 of the valve 47 to the ends of the valve casing, where pressure builds up. When this pressure is vented from the upper or lower end of the valve through conduit 53 or 54 respectively, the pressure at the opposite end of the valve moves the piston up or down. The venting of pipes 53 and 54 is effected by spring-seated valves 55 and 56, operated periodically by cams 57 and 58 on cam shaft 31.

The cams open and close the valves at the appropriate times, so that arm 16 is oscillated on rotary pivot 17 whenever it is necessary to swing one pair of tongs from takeout position to delivery position, and the other pair from delivery position into inclined position for travel toward an oncoming finishing mold. The last mentioned pair of tongs—assumed to be tongs 11 on arm 14 for descriptive purposes—will thus begin to revolve rapidly because of its being at a relatively great radial distance from the axis of shaft 18, and will move in path B C concentric with said axis.

Path B C intersects path A A of the finishing mold unit, and when the tongs 11 arrive at C, movement is imparted thereto to cause them to travel while inclined substantially about the axis of the finishing mold carrier (not shown) and substantially in the path C D, and while so traveling, the tongs preferably are held in radial alignment with the cavities of the finishing mold unit. Such operations are accomplished by the following means.

Located adjacent the path of the carrier 16 is cam 59, secured for radial adjustment to bracket 61, mounted for vertical adjustment on bearing 19. Cam 59 acts in two ways upon the tongs to control their position in the takeout zone: first it moves them in and down and then out and up by slightly oscillating carrier 16 on its pivot 17, and it also imparts rotary movement to the tongs in their supporting arm against the action of a tension spring 60 extending between the tongs and normally holding them in radial alignment with each other. Both movements result from the engagement with the cam of rollers 62 on a crosshead 63 connected to the upper end of a spindle 64 (Fig. 3) journaled in the arm which supports the tongs, as for example, arm 15 of tongs 12. It will be understood that the tongs 11 and their mountings and operating means are identical in construction with tongs 12 and associated parts.

At its lower end, spindle 64 carries cylinder 65 containing piston 66 which opens and closes the tongs. The tongs are pivoted on the bottom of cylinder 65 and opened by the admission of air through duct 67, spindle 64, thence into cylinder 65. Exhaust of such air permits a spring 68 to close the tongs.

Cam 59 is so shaped and located—being preferably cylindrical and concentric with path A A of the finishing mold—as to effect the in and down and up and out movements of the tongs as they revolve from C to D. A radial component of movement of the tongs with respect to their axis of revolution thus is obtained as a result of which the tongs substantially follow the path A A of the finishing mold from C to D. At the same time, the tongs are turned in their arm (14 or 15) first in one direction to align them radially with the necks of the ware in the finishing mold unit, then in the other direction to maintain such alignment as they are being closed about the ware, this assuring a smooth and efficient operation and preventing injury to the glassware as it is taken out.

The cam rollers 62 are yieldingly held in engagement with cam 59 by air entrapped in one end or the other of cylinder 35, depending upon which pair of tongs is in takeout position, there being sufficient clearance at the ends of the strokes of piston 34 for this purpose. The above described provisions for adjusting the length and timing of the strokes of piston 34 may be utilized for so maintaining the rollers 62 in engagement with cam 59. The tongs are caused to close intermediate C and D by the exhaust of air through conduit 67, the conduits 67 for each pair of tongs being connected with vertical ducts 67a in shaft 18 (Fig. 4) which lead upwardly to annular grooves 69.

Communicating with these grooves through bearing 21 are pipes 71, 72 which in turn are joined to spring seated, multiple, supply and exhaust valves 73, 74, opened and closed periodically by two-part adjustable cams 75 and 76 on cam shaft 31. Valves 73 and 74 receive live air from pipe 77 for delivery to pipes 71 and 72 when the valves are opened by the cams; otherwise the valves permit air to exhaust from the pipes 71 and 72 through their respective valve-controlled exhaust ports, one of which ports is seen at 78, Fig. 6. Said valves are of known type and need not be further described.

When a pair of tongs, for example tongs 11, is traveling along path C D of Fig. 2, cam 75 closes valve 73, or permits it to close, exhausting air from cylinder 66 and causing tongs 11 to be closed by spring 68 about the necks of the ware while traveling therewith. The finishing mold unit preferably is cracked just before the tongs close. Said unit is then opened, the tongs holding the ware for the "stripping" of the molds therefrom, and a cam 27 comes into engagement with roller 28, which raises shaft 18 and lifts the ware from the bottom plates of the mold unit. Almost immediately, piston 34 comes into action, oscillating carrier 16 on its pivot 17 and swinging

tongs 11 and the ware from takeout to delivery position over conveyor 13, with the assistance of the rotation of shaft 18. The tongs may thus be caused to travel along a resultant path such as shown at D E, Fig. 2. It will be understood that this movement of the tongs from takeout position to delivery position is so timed, and the tongs moved at such speed as to prevent the bottoms of the articles from striking each other, as they might otherwise do, when, for example, the articles are loosely held by the tongs, as is preferred though not essential.

It will be understood that as the tongs leave the takeout position, spring 60 restores the tongs to their normal radial position so that by the time they arrive above the conveyor, they and the ware are in line with the conveyor, which is of course properly positioned to that end. The tongs may be opened at the instant the swing of carrier 16 on pivot 17 terminates, and it is preferred, though not necessary, that the tongs be lowered just prior to opening by cam 27 leaving roller 28, to prevent shock to the ware as it is released to the conveyor.

When one pair of tongs is being swung from D to E, the other pair is moved from E to B in the path substantially as shown in Fig. 2, and into their outermost position. The outerwardly held tongs travel relatively fast from B to D, whereas those over the conveyor rotate slowly, affording ample opportunity for the ware released therefrom to be carried from between them and out of their path of travel.

The conveyor may be driven continuously or intermittently, and usually is timed with the takeout mechanism to deliver the ware to the lehr or lehr stacker (not shown) in predetermined sequence.

Various changes may be made in the details of construction and mode of operation of my novel takeout mechanism without departing from the invention as defined by the claims hereto appended, and although my invention has been illustrated and described for use with plural cavity molds, or mold units, it is to be understood that use thereof with single cavity molds or mold units is contemplated. It will be apparent that my invention is of particular utility in taking out panel glassware from either plural or single cavity molds, and also that only one pair of tongs need be used when the glassware taken out is produced at low speed.

Having thus described my invention, what I desire to claim and secure by Letters Patent is:

1. In glassware handling machinery including a traveling finishing mold held inclined for the removal of glassware therefrom, takeout mechanism comprising a pair of tongs, a vertical shaft provided with a horizontal pivot, a carrier for the tongs mounted on said pivot, means for rotating the shaft about its vertical axis, means for oscillating the carrier about said horizontal pivot, and means for so timing the last-named means that the tongs first are revolved in a path adjacent that of the finishing mold for taking out the ware in said mold, and then are swung away from the mold and toward said vertical axis into a ware delivery position.

2. In glassware handling machinery including traveling finishing molds held inclined for the removal of glassware therefrom, takeout mechanism comprising two pairs of tongs, a carrier for the tongs, downwardly diverging members on the carrier upon which the tongs are respectively mounted, means for rotating the carrier about a vertical axis, means for oscillating said carrier about a horizontal axis, and means for timing said last-named means so that the pairs of tongs are successively revolved in a path adjacent that of the finishing molds in a takeout zone for taking out the ware in said molds, and are successively swung away from said molds toward said vertical axis into a ware delivery position.

3. In glassware handling machinery including a traveling finishing mold held inclined for the removal of glassware therefrom, takeout mechanism comprising a pair of tongs, means for revolving said tongs in inclined position adjacent the path of the finishing mold, and means for imparting turning movement to the tongs during such revolution thereof, to maintain them substantially in radial alignment with glassware in said finishing mold.

4. In glassware handling machinery including a traveling finishing mold held inclined for the removal of glassware therefrom, takeout mechanism comprising a pair of tongs, means for rotating said tongs on a vertical axis in horizontal ware delivery position, means for oscillating said tongs away from and toward said vertical axis into and out of an inclined takeout position and into and out of said horizontal delivery position, and means operable while the tongs are in inclined takeout position and traveling adjacent the path of the finishing mold for imparting a horizontal component of motion thereto radially of said vertical axis to cause them substantially to follow the path of the finishing mold while removing ware therefrom.

5. In glassware handling machinery including a traveling finishing mold held inclined for the removal of glassware therefrom, takeout mechanism comprising a pair of tongs, means for rotating said tongs about a vertical axis, means for oscillating said tongs away from and toward said vertical axis into inclined takeout and horizontal delivery positions, means operating while the tongs are in inclined position for imparting a horizontal component of motion thereto to cause them substantially to follow the path of the finishing mold, and means for imparting rotary movement to the tongs to hold them substantially in radial alignment with the ware in the finishing mold.

6. In glassware handling machinery including traveling finishing molds held inclined for the removal of glassware therefrom, takeout mechanism comprising two pairs of tongs, a carrier for the tongs, means for rotating said carrier about a vertical axis, means for oscillating said carrier to alternately position the pairs of tongs in inclined takeout and horizontal delivery positions so that the tongs are successively revolved adjacent the path of the finishing molds and successively moved away from said path into delivery position, means for imparting a horizontal component of motion to each pair of tongs as it moves through the takeout zone to cause its path to approximate that of the finishing molds, means for imparting rotary movement to the tongs to maintain them substantially in radial alignment with the ware in the mold with which they cooperate, and means for closing and opening the tongs when in takeout and delivery positions respectively.

ALGY J. SMITH.