March 31, 1942. D. K. MORGAN 2,277,828

PLURAL TONGS MECHANISM FOR GLASSWARE

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Fig. 1.

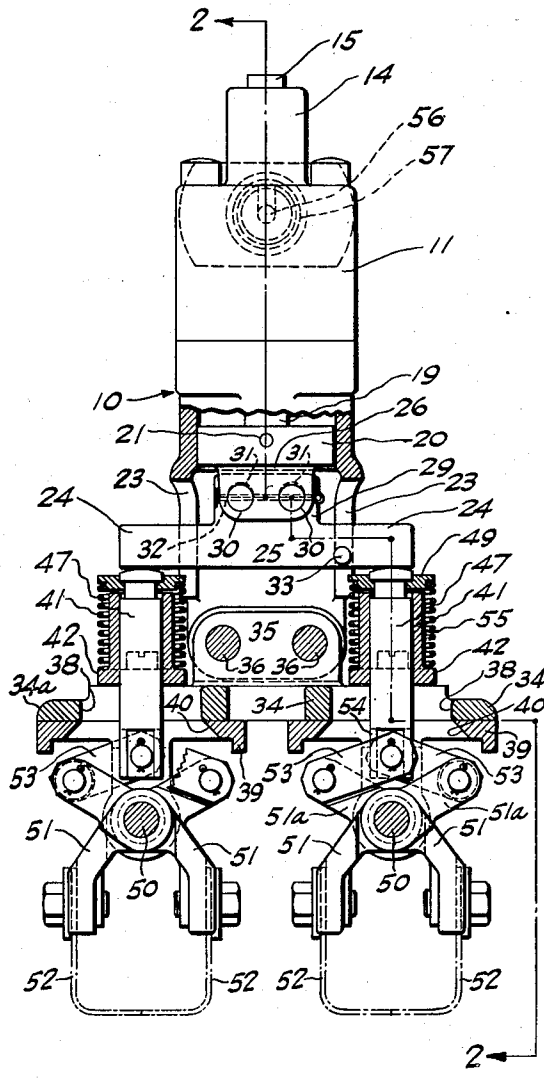
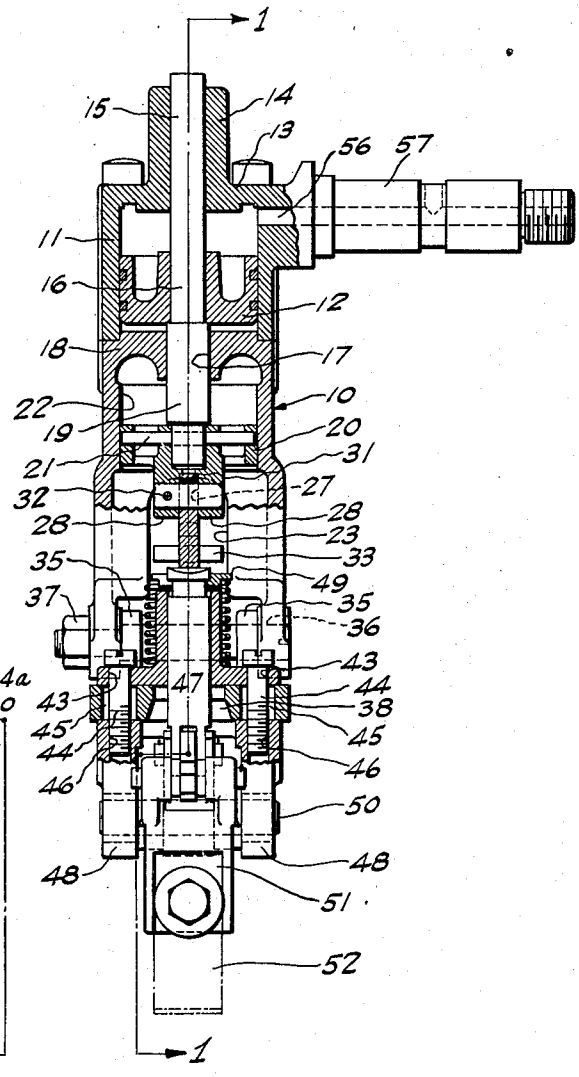


Fig. 2.



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PLURAL TONGS MECHANISM FOR GLASSWARE

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10 Claims. (Cl. 294—87)

This invention relates to improvements in devices for transferring articles of glassware from one place to another, as from a molding unit of a glassware forming machine to an adjacent cooling plate, moving conveyor or other delivery station.

The invention relates more particularly to glassware transferring mechanism of the kind that includes tongs operable to grip and support each article to be transferred and thereafter to release the article at a delivery station.

An object of the present invention is to provide a reliable and efficient glassware transferring mechanism having a plurality of tongs for use to effect the transfer simultaneously of a like number of articles of glassware from one place to another, irrespective of minor variations in the distances between the several articles at the pick-up station or of variations in or differences between the dimensions of the portions of the several articles to be gripped by the several tongs during the same operation.

A further object of the invention is to provide a plural tongs glassware transferring mechanism of the character described which will afford facilities for relative adjustment between the several tongs to vary the distance between their places of engagement with articles of glassware which are to be simultaneously transferred by the mechanism.

A further object of the invention is to provide plural tongs glassware transferring mechanism of the character described in which the means for mounting the several tongs are constructed and arranged to permit independent angular adjustment of the several tongs about their respective vertical axes.

Another object of the invention is to provide a plural tongs mechanism which is well adapted by reason of its construction and mode of operation to function as the takeout means for a glassware forming machine unit by which a plurality of similar articles of glassware are produced simultaneously.

Other objects and advantages of the invention will hereinafter be pointed out or will become apparent from the following description of a practical embodiment of the invention, as shown in the accompanying drawing, in which:

Figure 1 is a view, partly in side elevation and mainly in vertical section, showing the supporting structure and operating elements of a plural tongs glassware transferring mechanism of the present invention, the view being substantially along the line 1—1 of Fig. 2;

Fig. 2 is a similar view at a right angle with Fig. 1, the view being taken substantially along the line 2—2 of Fig. 1.

A mechanism constructed according to the present invention, as illustrated in the drawing, may comprise a support, generally designated 10, which may take the form of a substantially cylindrical upright frame or casing. This frame or casing may have its upper portion formed to constitute a power cylinder 11 in which a piston 12, Fig. 2, is disposed and may be reciprocated vertically. The cylinder 11 may be closed at its top, as at 13, except for a central upwardly extending tubular boss or extension 14. This may serve as a guide for an upwardly extending portion 15 of a rod 16 which extends vertically through the piston 12 and is reciprocated vertically by the latter. The rod 16 has a lower portion depending below the piston 12 through a suitable central opening 17 in a bottom head 18 for the cylinder 11. This depending lower portion of the rod 16, indicated at 19 in the drawing, carries a head 20 which may be secured to the reduced lower end portion of the rod by a transverse pin 21. The head 20 may fit slidably in a chamber 22 that is provided within the support 10 beneath the cylinder 11.

The lower portion of the support 10 may be slotted vertically at its opposite sides, as at 23, Fig. 1 to afford clearance for the protruding opposite end portions 24 of a cross bar 25 which is carried by the head 20. The structural arrangement by which the cross bar 25 is connected with the head 20 constitutes one of the features of novelty of the present invention. The head 20 has a depending central portion 26 transversely slotted from its bottom for part of its heighth, as indicated at 27, Fig. 2, to provide a pair of depending ears 28 which straddle an upstanding rib 29 on the cross bar 25. This rib 29 is connected with the ears 28 by a pair of pins 30 which respectively extend through aligned openings in the ears 28 and the interposed rib 29. These pins 30 are located laterally of the vertical axial line of the head 20 at equal distances from such vertical axial line. The pins 30 may fit snugly in the holes in the ears 28 through which such pins extend but are loosely received in the holes in the rib 29. The latter holes are indicated at 31 as being larger than the pins 30, particularly in a vertical direction. Also, a cotter pin 32 may be used to fasten the pins 30 to one of the ears 28 to prevent play between these pins and the head 20. The cross bar 25 thus may tilt vertically relative to the head 20 under certain con-

ditions although normally moving in unison with the latter. This type of connection between the cross bar and the head 20 is preferred. A single pivot pin at the vertical axial line of the head may be used in lieu of the two pins 30 with some of the advantages of the construction employing the latter.

The cross bar 25 may be prevented from moving laterally to any substantial extent during its vertical movements, as by a cross pin 33 extending through a portion of this cross bar 25 within the confines of one of the vertical slots 23 in the support 10.

The support 10 is provided at its lower end with a bottom frame member 34 having laterally projecting opposite portions 34a as shown in Fig. 1. A pair of upstanding attaching ears 35 on the bottom member 34 may be fastened to side walls of the slotted lower part of the support 10, as by bolts 36, Fig. 1, each of which may be provided with a nut 37 as shown in Fig. 2 for one of the bolts.

The bottom member 34 may be provided with similar vertical apertures 38 in the laterally projecting portions 34a thereof, these apertures being located equi-distant from the vertical axis of the support 10. Hanger brackets 39 have flat head portions fitting against the flat bottom surfaces of the portions of the bottom member 34 which surround the apertures 38. Each of these brackets 39 has an opening through its head portion, as indicated at 40, in alignment with the superjacent aperture 38. A vertical sleeve 41 is provided on each laterally projecting portion 34a of the bottom member 34. Each sleeve 41 has a flange or laterally enlarged lower end portion 42 resting upon the member 34 and provided at diametrically opposite points with vertical openings 43 adapted for the reception of the shanks of cap bolts 44. These cap bolts extend loosely through openings 45 in portions of the member 34 adjacent to the openings 38 and are threaded into vertical openings 46 in the head portions of the bracket members 39. There are two diametrically opposite cap bolts for each of the bracket members 39. The heads of the cap bolts overlie the bottom flanges of the sleeves 41. The arrangement is such that when the cap bolts are tightened, each sleeve will be clamped against the top surface of a portion of the bottom frame member 34 while the underlying bracket 39 will be clamped against the bottom surface of the same portion of the frame member 34. Since the openings 45 through which the shanks of the cap bolts 44 extend are substantially larger than the shanks, the cap bolts may be loosened and the sleeves and the underlying brackets adjusted horizontally in any direction, including an angular adjustment about a vertical axis extending through the center of the underlying bracket.

A plunger 47 is slidable vertically in each of the sleeve members 41 and extends downwardly through the underlying aligned openings 38 and 40 into a space between depending hanger portions 48 of the underlying bracket 39. Each plunger may have a peripherally slotted upper end portion provided with a washer 49 which overlies the sleeve 41 and thus limits the downward movement of the plunger.

A horizontal pivot pin 50 is supported by the hanger members 48 beneath the level of the lower end of the associated plunger 47. This pivot pin supports pivotally arms 51 which carry the tong jaws or article gripping members 52. The arms 51 may be provided with upwardly extending inclined attaching knuckles or extensions 51a which are connected by links 53 and suitable pivot pins with the vertically slotted lower end portion 54 of the plunger 47. A coiled expansion spring 55 surrounds each sleeve 41 between its bottom flange 42 and the washer 49 at the upper end of the plunger. These springs urge the heads of the plungers 47 continuously against the bottom surfaces of the opposite end portions of the cross bar 25.

The operation of the mechanism just described will be readily understood. The cylinder 11 may be in communication at its upper end with a pressure fluid intake and exhaust passage 56 in a lateral shaft 57 which may be integral with the upper portion of the support 10. When air is admitted to the cylinder 11 above the piston 12, the latter will be driven downward, thereby moving the cross bar 25 and the plungers 47 downward. The downward movement of the plungers 47 against the resistance of the expansion springs 55 will cause the arms 51 to move the jaws 52 of the tongs members and thus will effect closing of these jaws. This operation may be effected in the place at which articles standing adjacent to each other at a takeout or receiving station are to be gripped by the jaws of the two tongs shown in the drawing. In the event that the portions of the articles of glassware to be gripped by the tongs are of slightly different diameters or cross sectional dimensions, the jaws of one tongs may close in engagement with its article in advance of the closing of the jaws of the other tongs. The pins 30 which connect the cross bar 25 with the head 20 remain in contact with the bottoms of the openings in the upstanding rib 28 of that cross bar while both tongs are closing. If however, one of the tongs has closed about its article, while the other tongs has not completely closed, the cross bar 25 may tilt in a vertical plane because of the space between one of the pins 30 and the upper or top wall of its opening in the rib of the cross bar and the second tongs thus may also be closed about its article.

The adjustment of each of the brackets 39 relative to the supporting bottom frame member 34 and to the other bracket 39 permits a wide range of relative adjustments between the tongs at their closing positions so that considerable variation may take place in the distances between two articles which are gripped simultaneously by the two tongs. Also, the jaws of each tongs may be closed to grip articles from directions which vary angularly with relation to one another, this by reason of the possible angular adjustment of each of the tongs around a vertical axis coincident with the axis of its plunger 47. It will be understood that these adjustments of the tongs, either laterally or angularly, may be made when the cap screws 44 have been loosened and that each such adjustment may be made of a tongs and its connected operating mechanism as a unit without impairing the operating association of the cross bar of the common actuating mechanism of the device with the plungers of the several units.

The shaft 57 may serve as a means for attaching the plural tongs glassware transferring mechanism just described to any suitable known or preferred means for moving such mechanism bodily between selected stations. Thus, this shaft may serve as a means for connecting the plural tongs mechanism with a swinging parallel motion device and associate structure, such as are

shown in the Ingle Patent No. 1,911,119 of May 23, 1933, Figs. 1, 2, 3, 4 and 6 and as described on page 13 of the specification of that patent under the heading "Takeout mechanism C."

The invention is not limited to the details of the illustrative embodiment of the invention shown in the drawing and herein particularly described as many changes therein and modifications thereof will be obvious to those skilled in the art.

I claim:

1. A mechanism for transferring glassware comprising a support, a plurality of tongs, each comprising a pair of pivoted jaws carried by said support, and means for opening and closing said jaws, said means being constructed and arranged to cause simultaneous closing of the jaws of all of said tongs to grip articles of glassware of like dimensions and configurations and to cause differential closing movements of the jaws of different tongs to grip articles of glassware of unlike dimensions or configurations.

2. A mechanism for transferring articles of glassware comprising a support, a plurality of tongs carried by the support, each comprising a pair of pivoted jaws for gripping articles of glassware, means for simultaneously opening the jaws of all said tongs, and means for simultaneously imparting closing movements to the jaws of all said tongs, said last named means being constructed and arranged to cause the closing movements of the jaws of one pair of tongs to continue when unobstructed by the article to be gripped by such jaws after the jaws of another of said tongs have been fully closed in gripping relation to another article of glassware.

3. A mechanism for transferring glassware comprising a support, a plurality of tongs suspended from said support and each comprising a pair of pivoted jaws, vertically movable plungers respectively connected with said pairs of jaws to close them when the plungers move in one direction and to open the jaws when the plungers move in the opposite direction, means for moving the plungers in the direction to open the jaws of the tongs, and means for simultaneously moving the plungers in the direction to close the jaws of the tongs, said last named means comprising a vertically movable actuator, and a cross bar interposed between the actuator and said plungers, said cross bar having loose pivotal connections with the actuator at two places respectively equi-distant from the axis of vertical movement of the actuator to permit tilting of the cross bar and continued closing movement of the jaws of one tongs after the jaws of another tongs have closed.

4. A mechanism for transferring glassware comprising a supporting structure, a plurality of tongs suspended from said supporting structure and each comprising a pair of pivoted jaws, vertically movable plungers carried by said supporting structure above the respective tongs, links connecting the lower ends of said plungers with the pivoted jaws of the several tongs for closing the jaws when the plungers move downward and for opening the jaws when the plungers move upward, spring means urging said plungers upward and tending to maintain the jaws of the tongs open, a cross bar having end portions resting upon said plungers, a vertically movable actuator having a head portion loosely and pivotally connected with said cross bar at points equi-distant from the axis of vertical movement of said actuator, whereby downward movement of the actuator will cause the cross bar to remain horizontal as it is moved downward by the actuator until the jaws of one of said tongs is closed in contact with an article of glassware and then may cause a tilting movement of the cross bar to effect further movement of the jaws of another of said tongs to grip another article of glassware.

5. A mechanism for transferring a plurality of articles of glassware simultaneously comprising a supporting frame structure, a plurality of tongs, each comprising a pair of pivoted jaws, means for suspending said tongs from said supporting structure in horizontally spaced relation with each other, said means being constructed and arranged to permit adjustment of the horizontal distance between the several tongs, and means carried by said supporting structure for opening and closing said tongs in all of said relatively adjusted positions.

6. A mechanism for transferring a plurality of articles of glassware simultaneously comprising a supporting frame structure, a plurality of tongs, each comprising a pair of pivoted jaws, means for suspending said tongs from said supporting structure in horizontally spaced relation with each other, said means being constructed and arranged to permit independent lateral adjustments of the several tongs, and means for opening and closing all said tongs in all of their said adjusted positions.

7. A mechanism for transferring a plurality of articles of glassware simultaneously comprising a supporting frame structure, a plurality of tongs, each comprising a pair of pivoted jaws, means for suspending said tongs from said supporting structure in horizontally spaced relation with each other, said means being constructed and arranged to permit adjustment of the distance between the several tongs and to permit angular adjustment of each of said tongs about its vertical axis, and means also carried by said supporting structure for opening and closing said tongs in all of the various adjusted positions thereof.

8. A mechanism for transferring glassware comprising an upright substantially cylindrical frame structure, a bottom member for said frame structure, a plurality of brackets beneath said bottom member, vertical sleeves located on said bottom member above said brackets, tongs carried by said brackets and each comprising a pair of jaws pivoted to its bracket, vertically reciprocable plungers mounted in said sleeves and depending through said bottom member to positions adjacent to said jaws, links connecting said plungers with the pairs of pivoted jaws, and means connecting each associated bracket and superjacent sleeve with each other and with said bottom member to maintain these parts in assembled relation and to permit adjustment of the associated sleeve, bracket, pivoted jaws and plunger as a unit relative to the supporting bottom member.

9. A mechanism for transferring glassware comprising an upright substantially cylindrical frame structure, a bottom member for said frame structure, a plurality of brackets beneath said bottom member, vertical sleeves located on said bottom member above said brackets, tongs carried by said brackets and each comprising a pair of jaws pivoted to its bracket, vertically reciprocable plungers mounted in said sleeves and depending through said bottom member to positions adjacent to said jaws, links connecting said plungers with the pairs of pivoted jaws, means

connecting each associated bracket and superjacent sleeve with each other and with said bottom member to maintain these parts in assembled relation and to permit adjustment of the associated sleeve, bracket, pivoted jaws and plunger as a unit relative to the supporting bottom member, spring means acting on said plungers to urge the jaws of each tongs continuously to open positions, a piston reciprocable vertically in said cylindrical frame structure, and a cross bar carried by said piston in engagement with said plungers to move them in opposition to said spring means to effect closing of the jaws of said tongs.

10. A mechanism for transferring glassware comprising a support, a plurality of tongs suspended from said support and each comprising a pair of pivoted jaws, vertically movable plungers respectively connected with said pairs of jaws to close them when the plungers move in one direction and to open the jaws when the plungers move in the opposite direction, means for moving the plungers in the direction to open the jaws of the tongs, means for simultaneously moving the plungers in the direction to close the jaws of the tongs, said last named means comprising a vertically movable actuator, and a cross bar interposed between the actuator and said plungers; and means for pivotally connecting said cross bar with said actuator to permit bodily movement of the cross bar vertically in unison with the actuator and also limited rocking of the cross bar in a vertical plane relative to the actuator.

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