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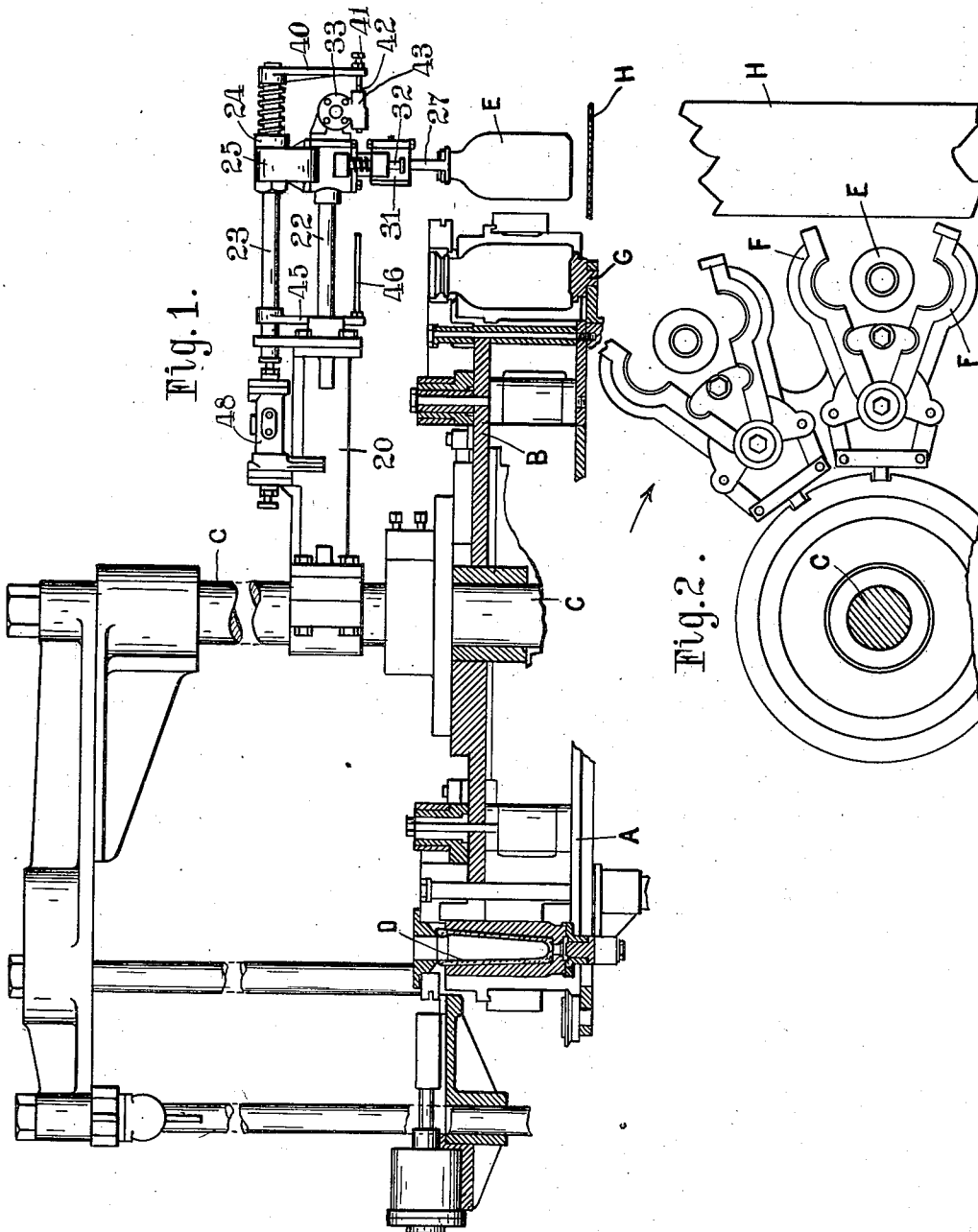
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SAFETY TAKE-OUT FOR GLASSWARE MAKING MACHINES

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3 Sheets-Sheet 1



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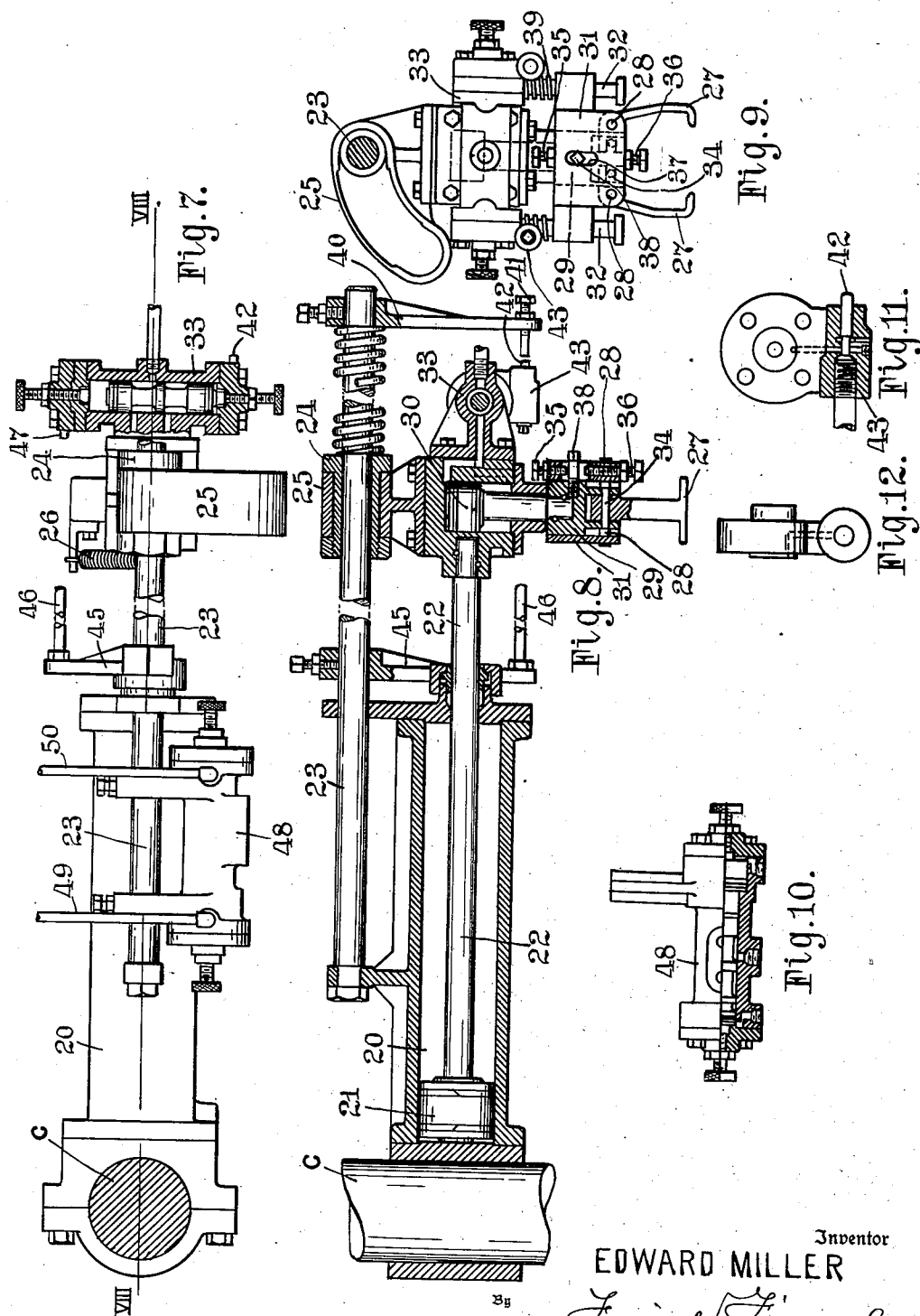
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3 Sheets-Sheet 3



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SAFETY TAKE-OUT FOR GLASSWARE
MAKING MACHINESEdward Miller, Columbus, Ohio, assignor to
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26 Claims. (Cl. 214—1)

The present invention relates to glassware forming machines and more particularly to mechanism for automatically removing ware from a mold of the machine, moving it laterally and depositing it upon a suitable support. Such mechanism is commonly termed a take-out mechanism.

More particularly the present invention concerns a take-out means and its arrangement in respect to the ware making machine and because such a take-out is at one point or station in the circle of travel of the mold supports it is important to provide means avoiding injury to the take-out means by collision of the moving mold or molds with the take-out in the event of the failure of the latter to operate properly, hence it is the principal object of the present invention to provide an improved take-out mechanism in which the parts yield and are unharmed in the event of such collision. One of the principal aims and objects of the invention is to improve the construction of take-out mechanism by providing safety means for preventing injury to the take-out mechanism in the event of collision with another part of the machine, as for example, the moving mold. Other objects and advantages will appear from a consideration of the accompanying drawings and the following description.

In the accompanying drawings illustrating an example of the invention—

Figure 1 is an elevation with parts in section and with parts broken out illustrating sufficient of a glass ware making machine with the take-out according to my invention applied thereto.

Fig. 2 is a detail in plan view illustrating blow mold sections or cages separated and in position to permit the operation of the take-out means.

Fig. 3 is a plan view on a larger scale of the take-out mechanism illustrating piping of the air pressure system for operating the same.

Fig. 4 is a section on the line IV—IV, Fig. 3, looking to the right.

Fig. 5 is a side elevation of the mechanism as shown in Fig. 3 with the piping omitted.

Fig. 6 is a view in elevation of the right hand end of Fig. 5.

Fig. 7 is a view like that shown in Fig. 3 but on a larger scale and broken out with the spool valve for operating the ware gripper arms in section.

Fig. 8 is a vertical section of the mechanism on the line VIII—VIII Fig. 7 with parts broken out vertically.

Fig. 9 is a view in elevation of the right hand end of Fig. 8 with the end tripper arm omitted.

Fig. 10 is a half section and half elevation of

the spool valve for causing the reciprocation of the piston carrying the gripper head.

Fig. 11 is a detail sectional view on a larger scale than appears in Fig. 8 of one of the tripper valves for shifting the gripper head spool valve to change the direction of pressure.

Fig. 12 is a view looking at the left hand side of Fig. 11.

The invention is advantageously illustrated in connection with glassware forming machines embodying a parison mold support A and a finishing mold support B. The parison mold support A is provided with the usual parison molds in which parisons D may be shaped in any suitable manner. The finishing mold support is advantageously movable and carries a plurality of finishing or blow molds F into which the parisons are transferred and blown to finished articles E as is usual. As is customary in such machines, the finishing molds F are automatically opened as the molds approach the discharge position where the finished ware is to be removed, the ware in this position being supported on the mold bottom G preparatory to being gripped by the take-out mechanism and transferred to the travelling belt or other support H.

The take-out mechanism for removing the ware from the machine may advantageously comprise a gripping head 19 fixed upon the end of a rod 22 carrying a piston 21 working within a pneumatically operated cylinder 20 which may be securely clamped to a stationary column C of the machine.

A guide bar 23 is securely supported in the fixed supports carried by the cylinder 20 and has a portion extending laterally beyond the end of the cylinder and in substantially vertical alinement with the piston 22. The rod 23 slidably carries a spool bearing 24 which is mounted in an arcuate shaped limiting yoke 25 secured to the gripper head 19 (see Figs. 8 and 9). Thus the outer end of the piston rod 22 adjacent the gripper head is supported against deflection by the bearing 24 and rod 23. The arcuate shaped limiting yoke 25 may advantageously be of the form illustrated in Fig. 9, being curved about a center at the piston rod 22 so as to permit rotating movements of the gripper head and piston rod elements to the guide rod 23 within a limited region. A spring 26 connected at one end to the gripper head and at its opposite end to the bearing 24 serves to hold the gripping head in normal upright position.

The gripping head 19 comprises a pair of gripping jaw levers 27 herein illustrated as of the bell crank lever type, being supported on pins 28

in the lower end of a sleeve 31 surrounding the block 29, said block being fixedly connected to the lower end of the piston member 30, reciprocable vertically in a cylinder formed in the gripper head (see Fig. 8). The sleeve 31 constitutes an adjustable sheath for the block 29 and is slidable on said block. The sleeve may advantageously be provided with laterally perforated ears surrounding parallel vertical rods 32 carried by the gripper head 19, said rods being headed at their lower ends. A spool valve 33 mounted at the forward end of the gripping head 19 is designed to reciprocate the piston 30 within its cylinder and in turn operate the jaw levers 27 either to grip and lift the ware or lower and release the ware.

The upper short arms of the gripper jaw levers 27 are bifurcated (see Fig. 9) and each bifurcation is engaged by a transverse pin 34 mounted in the block 29 so that when the block 29 and sleeve 31 are relatively shifted, the gripper jaws are swung apart or toward each other, according to the direction of shifting. For example, on the downward movement of the block the sleeve is arrested by the heads of the rods 32, and as the block 29 is further shifted downward in relation to the sleeve the gripper jaws are moved apart. Conversely, when the movement of the block 29 is upward, the jaws are moved toward each other. The jaws are opened on the final portion of the downward stroke and closed on the final portion of the upward stroke so that upward and downward strokes of the piston serve respectively to grip and lift the ware and then lower and release the ware.

The above described relative shifting movements of the block 29 and sleeve 31 may be adjustably controlled and regulated by vertical adjusting screws 35 and 36 oppositely located on the sleeve 31 so that their ends engage a part 37 of the block 29 slidable in a vertical slot 37 in the sleeve. By adjusting said screws 35 and 36 the degree of separation of the gripping jaws is made such that they straddlingly embrace the opposite sides of the neck of the ware and subsequently engage loosely the neck of the bottle or other ware resting on the mold bottom G in the open mold position. A spring 39, which may advantageously surround the pins 32 serves to urge the sleeve 31 downwardly around the block 29 and thus urge the jaws 27 toward closed position.

Fixedly secured to the outer end of the stationary rod 23 is a bracket or arm 40 having a downwardly extending portion carrying a horizontal set screw 41 in alignment with stem 42 of check valve 43 held normally closed by a spring (see Fig. 11). The check valve 43 controls the admission of air to a pneumatically operated spool valve within the casing 33 which controls the flow of fluid pressure alternately above and below the piston 30. Thus at the end of the outward stroke of the piston 21 the stem 42 of the check valve 43 engages the adjusting screw 41 and permits the flow of fluid pressure to shift the spool valve within the casing 33 and direct pneumatic pressure to the top of the piston 30, to lower and release the ware. The second bracket member 45 is also carried by the guide rod 23 adjacent the end of the cylinder 20 and has a horizontally extending stop member 46 in the path of a stem 47 of a check valve (see Figs. 3 and 7) similar in construction to the check valve 43 and operative to reverse the direction of pressure to the spool valve within the casing 33 and consequently the piston 30.

The horizontal reciprocation of the piston rod

22 and the gripping head 19 may be controlled by any suitable means, as for example, a sliding shiftable spool valve in a casing 48 (see Fig. 10) for changing the direction of air pressure within the cylinder 20, the shifting of the spool valve being effected in a well known manner as by pressure through timer pipes 49 and 50 (see Fig. 3). In operation steady pressure is applied to the spool valve 48 through line 51 (see Fig. 3). Fluid pressure is alternately admitted to the opposite ends of the spool valve 48 by the timer pipes 49 and 50 to alternately shift the spool valve within the casing 38 in the opposite direction and thus control the flow of air under pressure to the opposite ends of the cylinder 20. For example, air being admitted to the spool valve casing from the timer line 49, the spool valve (see Fig. 10) is shifted to the right, admitting air from the steady pressure line 51 to the end of the cylinder 20, thus moving the piston and gripper head outwardly. Conversely, when air is admitted through line 50 the spool valve within the casing 50 is shifted to the left (Fig. 10) admitting air from the steady pressure line 51 to the outer end of the cylinder 20 and moving the gripper head and piston inwardly.

The reciprocative movements of the piston 21 within the cylinder 20 are cushioned toward the ends of their stroke by the provision of by-pass lines 52 and 56 (see Fig. 3) connected to the fluid pressure supply lines leading to the opposite ends of cylinder 20. The endmost lines are provided respectively with check valves 54 and 57 which permit the free flow of fluid pressure to the cylinder but check the exhaust therefrom. Thus, for example, during the inward movement of the piston 21 in the cylinder, pressure air is applied to the forward end of the cylinder 20 and the line. The air pressure ahead of the piston freely exhausts through line 52 until the piston has moved inwardly sufficiently to cover up line 52. Further exhaust is checked by the check valve 54 so that the reciprocative movements are adequately cushioned.

In operation the gripping head normally overlies the finished bottle in the open mold, the gripping tongs being in lowered open position. Upward movement of the piston 30 in the gripper head 19 first causes relative upward movement of the block 29 relative to the sleeve, causing the gripping tongs to close and grip the ware. Continued upward movement causes the block 29 and sleeve 31 to move in unison, lifting the ware from the bottom plate G. At this point, air supplied from the timer line 49, shifts spool valve in casing 48 to admit air under pressure to the inner end of the cylinder 20, moving the piston 30, piston rod 21 and gripping device with its supported ware outwardly. At the end of the outward stroke, the stem 42 of the valve 43 engages the adjusting screw 41 admitting air to the casing 33 on the gripper head 29 and reverses the spool valve therein to lower the piston 30. During the initial downward movement of the piston 30, the block 29 and sleeve 31 move in unison to lower the ware. When the ears of the sleeve engage the headed lower ends of the guide pins 32, however, downward movement of the sleeve is arrested and continued downward movement of the block, acting as the short arms of the bell crank lever tongs 27, acts to open them, releasing the ware on the conveyor or other support. Air from the timer controlled line 50 then reverses the air pressure in the cylinder 20 to move the piston 21 and gripper head inwardly and engage another article.

Should the take-out mechanism become jammed with another part of the machine, as for example, a moving mold, the gripper head 29 may rock or swing about the axis of the piston rod 22 and in a direction normal to its direction of lateral travel, while still maintaining supporting engagement with the supporting guide bar 23.

My invention is not to be restricted to the specific details illustrated and described, which are intended solely as illustrative of the invention.

What I claim is:

1. A glass ware take-out mechanism for a glass ware forming machine including a plurality of traveling blow molds, said take-out including a head carrying a pair of gripper jaws, means for moving said head and jaws back and forth between ware-taking and ware-releasing positions, means for actuating said jaws to take and release respectively the ware and supporting means for the head movably connected thereto and constructed and arranged to permit rotation of the head about a horizontal axis, and means for yieldingly holding said head against rotation relative to said supporting means.

2. A glass ware take-out mechanism for a glass ware forming machine including a plurality of traveling blow molds, said take-out including a head carrying a pair of gripper jaws, means including a cylinder and a piston and rod for moving said head and jaws back and forth between ware taking and ware releasing positions, means for actuating said jaws to take and release respectively the ware and means above the head and connected thereto for supporting and guiding the head during its back-and-forth movements and permitting working of said head about a horizontal axis.

3. A glass ware take-out mechanism for a glass ware forming machine including a plurality of traveling blow molds, said take-out including a head carrying a pair of gripper jaws, means including a cylinder and a piston and rod for moving said head and jaws back and forth between ware taking and ware releasing positions, means for actuating said jaws to take and release respectively the ware, and supporting means above the head and loosely connected thereto for supporting said head and permitting it to work laterally on the axis of said piston rod and means whereby said head is yieldingly held from lateral movement in normal operating position.

4. A glass ware take-out mechanism for a glass ware forming machine including a plurality of traveling blow molds, said take-out including a head carrying a pair of gripper jaws, means including a cylinder and a piston and rod for moving said head and jaws back and forth between ware taking and ware releasing positions, means for actuating said jaws to take and release respectively the ware, said head being carried by said piston rod and rockable laterally on the axis of said piston rod out of normal position in the event of collision of a mold therewith, and means whereby said head is yieldingly held from lateral movement in normal operating position.

5. A glass ware take-out mechanism for a glass ware forming machine including a plurality of traveling blow molds, said take-out including a head carrying a pair of gripper jaws, means including a cylinder and a piston and rod for moving said head and jaws back and forth between ware taking and ware releasing positions, means for actuating said jaws to take and re-

lease respectively the ware, said head being connected with said piston rod and rockable laterally with said piston rod out of normal position in the event of collision of a mold therewith, and means whereby said head is yieldingly held from lateral movement in normal operating position.

6. A take-out mechanism for glassware forming machines having a forming mold comprising a ware-gripping device, means for moving said gripping device laterally toward and from said mold, and supporting means for said gripping device including a rockable mounting permitting the latter to move out of its normal path of movement toward and from said mold.

7. A take-out mechanism for glassware forming machines having a forming mold comprising a ware-gripping device, means for moving said gripping device laterally toward and from said mold including a horizontally travelling member, and supporting means for the gripping device including a rockable mounting permitting the latter to move out of its normal path of movement toward and from said mold.

8. A take-out mechanism for glassware forming machines having a forming mold comprising a ware gripping device, means for moving said gripping device laterally toward and from said mold including a horizontally travelling member, and supporting means loosely connected to said device for guiding said device in its lateral movements permitting said device and member to rock about a horizontal axis, so that the gripping device may move out of its normal path of movement toward and away from said mold.

9. A take-out mechanism for glassware forming machines having a forming mold, comprising a ware-gripping device, means acting normally to hold said gripping device in vertically disposed position, means for imparting a lateral horizontal movement to said gripping device, and means for supporting said gripping device and having loose connection therewith permitting said gripping device to swing out of its normal vertical position and in a direction normal to its lateral horizontal travel.

10. A take-out mechanism for glassware forming machines having a forming mold, comprising a ware-gripping device, means acting normally to hold said gripping device in vertically disposed position, means for imparting a lateral horizontal movement to said gripping device, a stationary support for supporting said gripping device during its horizontal travel and having a slotted connection with said device for permitting said gripping head to swing out of its normal vertical position and relative to said support and to its lateral horizontal travel.

11. A take-out mechanism for glassware forming machines having a forming mold comprising a ware gripping device, a horizontally travelling member for moving said gripping device laterally toward and from the mold, stationary supporting means for supporting said gripping device during the horizontal travel, and rockable means mounting said gripping device permitting it to rock in a direction normal to its travel toward and from the mold and relative to said supporting means.

12. A take-out mechanism for glassware forming machines having a forming mold, comprising a ware-gripping device, a horizontally disposed cylinder and piston mechanism, said gripping device being carried by said piston to be moved thereby laterally toward and from the mold, stationary supporting means above the piston for

supporting said gripping device during its horizontal travel, and a slotted connection between said gripping device and supporting means permitting said gripping device to be rocked horizontally about the axis of the piston.

13. A take-out mechanism for glassware forming machines having a forming mold, comprising a ware-gripping device, a horizontally disposed cylinder and piston mechanism, said gripping device being carried by said piston to be moved thereby laterally toward and from the mold, a stationary supporting guide bar above the piston for supporting said gripping device during its lateral travel, and a slotted connection between said gripping device and guide bar permitting said gripping device to be moved relative to the direction of its travel toward and from the mold.

14. A take-out mechanism for glassware forming machines having a forming mold, comprising a ware-gripping device, a horizontally disposed cylinder and piston mechanism, said gripping device being carried by said piston to be moved thereby laterally toward and from the mold, a stationary supporting guide bar above the piston for supporting said gripping device during its lateral travel, and means on said gripping device embracing said guide bar permitting the gripping device to be moved in a direction normal to its lateral travel toward and from the mold.

15. A take-out mechanism for glassware forming machines having a forming mold, comprising a ware-gripping device, a horizontally disposed cylinder and piston mechanism, said gripping device being carried by said piston to be moved thereby laterally toward and from the mold, a stationary supporting guide bar above the piston for supporting said gripping device during its lateral travel, and an arcuate slotted yoke member carried by said gripping device and embracing said guide bar, permitting said gripping device to move in a direction normal to its direction of lateral travel toward and from the mold, and spring means connecting the guide bar and gripping device acting normally to hold said gripping device in vertical position.

16. In a glassware forming machine, a ware-gripping mechanism comprising a body member, an actuating member housed and vertically movable in said body member, a head secured to said actuating member, a sleeve member surrounding said head bodily movable therewith but slightly movable vertically with reference thereto the movement of said sleeve bodily being controlled solely by the movement of said head, a pair of ware-gripping tongs pivotally connected to said sleeve and head, and resilient means acting upon said sleeve member operative to urge said tongs to closed position.

17. In a glassware forming machine, a ware-gripping mechanism comprising a body member, an actuating member housed and vertically movable in said body member, a head secured to said actuating member, a sleeve member surrounding said head bodily movable therewith but slightly movable vertically with reference thereto the movement of said sleeve bodily being controlled solely by the movement of said head, a pair of ware-gripping tongs pivotally connected to said sleeve and head, means to variably adjust the position of said head and sleeve axially with reference to each other, and resilient means acting upon said sleeve member operative to urge said tongs to closed position.

18. In a glassware forming machine, a ware-

gripping mechanism comprising a body member, an actuating member vertically movable in said body member, a head secured to said actuating member, a sleeve member surrounding said head and movable vertically with reference thereto, a pair of ware-gripping tongs pivotally connected to said sleeve and head, means to variably adjust the position of said head and sleeve axially with reference to each other, including a part fixed on said head and adjusting means carried by said sleeve and engaging said part, and resilient means acting upon said sleeve member operative to urge said tongs to closed position.

19. In a glassware forming machine, a ware-gripping mechanism comprising a body member having a fluid pressure chamber therein, a fluid pressure operated actuating member vertically movable in said body member, a head secured to said actuating member, a sleeve member surrounding said head bodily movable therewith but slightly movable vertically with reference thereto the movement of said sleeve bodily being controlled solely by the movement of said head, a pair of ware-gripping bell crank levers pivotally connected to said sleeve member and operatively connected to said head, and resilient means acting upon said sleeve member and operative to urge said levers to closed ware-gripping position.

20. In a glassware forming machine, a ware-gripping mechanism comprising a body member, a single actuating member housed and vertically movable in said body member, a head fixedly secured to said actuating member, a sleeve member surrounding said head and movable vertically with reference thereto, a pair of ware-gripping bell crank levers pivotally connected to said sleeve member and operatively connected to said head, means for adjustably varying the relative axial position of said sleeve member and head to vary the normal open position of said levers, and resilient means acting upon said sleeve member and operative to urge said levers to closed ware-gripping position.

21. In a glassware forming machine, a ware-gripping mechanism comprising a body having a vertically disposed cylindrical fluid pressure receiving bore therein, a piston vertically movable within said bore, a head carried by the lower end of said piston, a sleeve member surrounding and bodily movable with and only by said head, a pair of ware-gripping bell crank lever tongs pivotally supported by said sleeve member and operatively connected to said head resilient means acting upon the sleeve member to urge said tongs into closed ware-gripping position, means for operating said piston vertically in said bore, the downward movement of said piston carrying with it the head and sleeve member to lower the gripping tongs and supported ware, and means to limit the downward movement of said sleeve member relative to the movement of said head to cause said tongs to open and release the ware.

22. In a glassware forming machine, a ware-gripping mechanism comprising a body having a vertically disposed cylindrical fluid pressure receiving bore therein, a piston vertically movable within said bore, a head carried by the lower end of said piston, a sleeve member surrounding and movable with said head, a pair of ware-gripping bell crank lever tongs pivotally supported by said sleeve member and operatively connected to said head, resilient means acting upon the sleeve member to urge said tongs into closed ware-gripping position, means for operating said piston vertically in said bore, the downward movement

of said piston carrying with it the head and sleeve member to lower the gripping tongs and supported ware, and means to limit the downward movement of said sleeve member independently of said head whereby additional downward movement of said actuator and head operates upon the bell crank lever tongs to cause them to open and release the ware.

23. In a glassware forming machine, a ware-gripping mechanism comprising a body having a vertically disposed cylindrical fluid pressure receiving bore therein, a piston vertically movable within said bore, a head carried by the lower end of said piston, a sleeve member surrounding and movable with said head, a pair of ware-gripping bell crank lever tongs pivotally supported by said sleeve member and operatively connected to said head, resilient means acting upon the sleeve member to urge said tongs into closed ware-gripping position, means for operating said piston vertically in said bore, the downward movement of said piston carrying with it the head and sleeve member to lower the gripping tongs and supported ware, guide means for guiding the sleeve in its vertical movements, and means to limit the downward movement of said sleeve member relative to further movement of said actuator and head to cause said tongs to open and release the ware.

24. In a glassware forming machine, a ware-gripping mechanism comprising a body having a vertically disposed cylindrical fluid pressure receiving bore therein, a piston vertically movable within said bore, a head carried by the lower end of said piston, a sleeve member surrounding and movable with said head, a pair of ware-gripping bell crank lever tongs pivotally supported by said sleeve member and operatively connected to said head, resilient means acting upon the sleeve member to urge said tongs into closed ware-gripping position, means for operating said piston vertically in said bore, the downward movement of said piston carrying with it the head and sleeve member to lower the gripping tongs and supported ware, guide means for guiding the sleeve in its vertical movements, and means associated with the guide means to limit the downward

movement of said sleeve member relative to further movement of said actuator and head to cause said tongs to open and release the ware.

25. In a glassware forming machine, a ware-gripping mechanism comprising a body having a vertically disposed cylindrical fluid pressure receiving bore therein, a piston vertically movable within said bore, a head carried by the lower end of said piston, a sleeve member surrounding and movable with said head, a pair of ware-gripping bell crank lever tongs pivotally supported by said sleeve member and operatively connected to said head, resilient means acting upon the sleeve member to urge said tongs into closed ware-gripping position, means for operating said piston vertically in said bore, the downward movement of said piston carrying with it the head and sleeve member to lower the gripping tongs and supported ware, means to adjustably vary the position of the sleeve and head axially with reference to each other, and means to limit the downward movement of said sleeve member relative to further movement of said actuator and head to cause said tongs to open and release the ware.

26. In a glassware forming machine, a ware-gripping mechanism comprising a horizontally reciprocable body having a vertically disposed cylindrical bore therein, a piston vertically movable within said bore, a head carried by the lower end of said piston, a sleeve member surrounding and bodily movable with said head, a pair of ware-gripping bell crank lever tongs pivotally supported by said sleeve member and operatively connected to said head, resilient means acting upon the sleeve member to urge said tongs into closed ware-gripping position, means for operating said piston vertically in said bore, the downward movement of said piston carrying with it the head and sleeve member to lower the gripping tongs and supported ware, means to limit the downward movement of said sleeve member relative to further movement of said actuator and head to cause said tongs to open and release the ware, and means actuated at the opposite ends of the strokes of the reciprocable body for reversing the movement of said piston.

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