

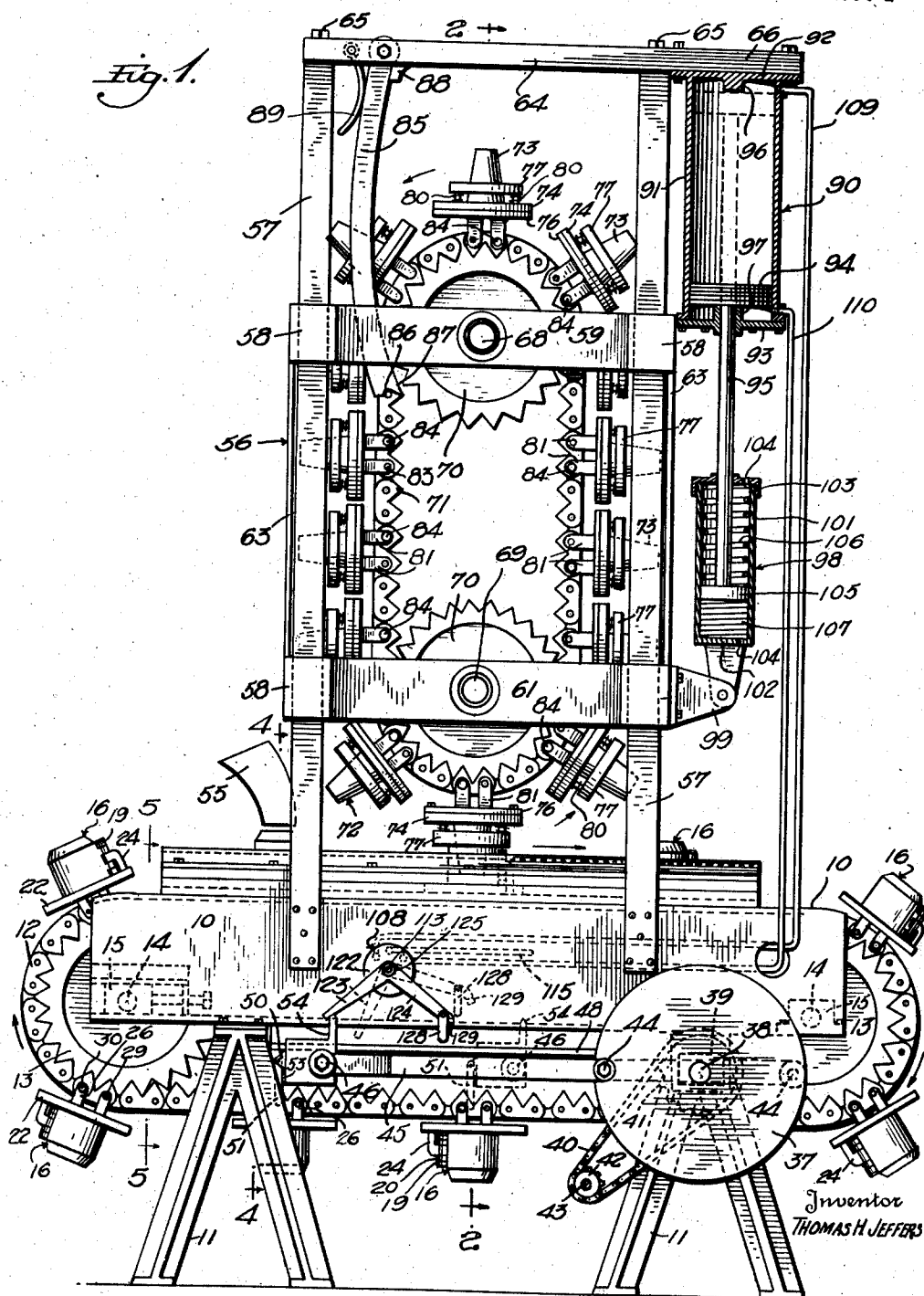
Aug. 19, 1941.

T. H. JEFFERS
GLASS PRESSING MACHINE

2,253,276

Filed Aug. 30, 1938

3 Sheets-Sheet 1



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C. R. Parker

Aug. 19, 1941.

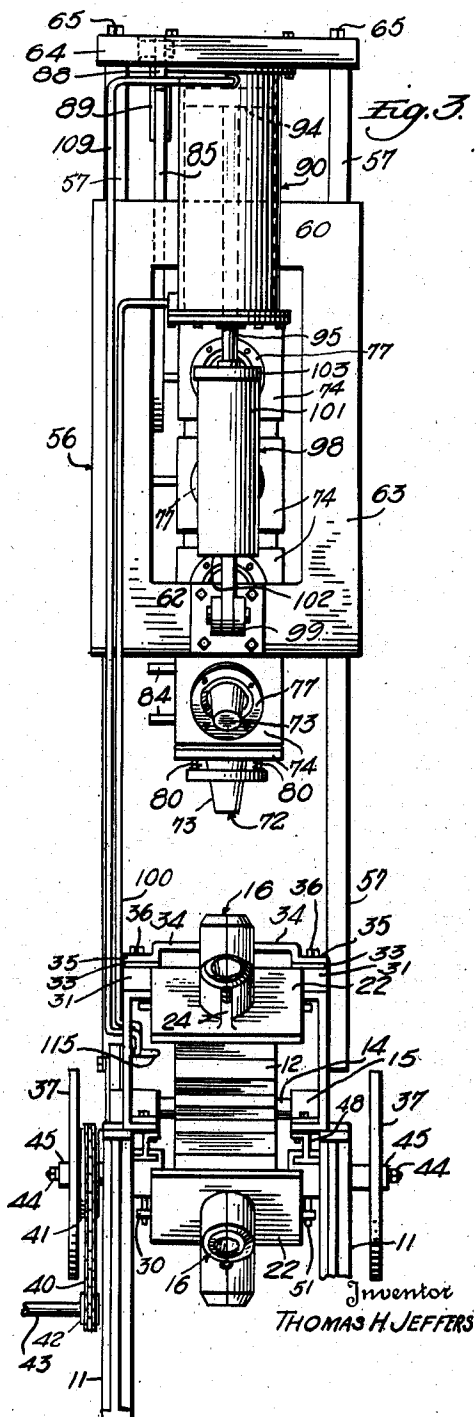
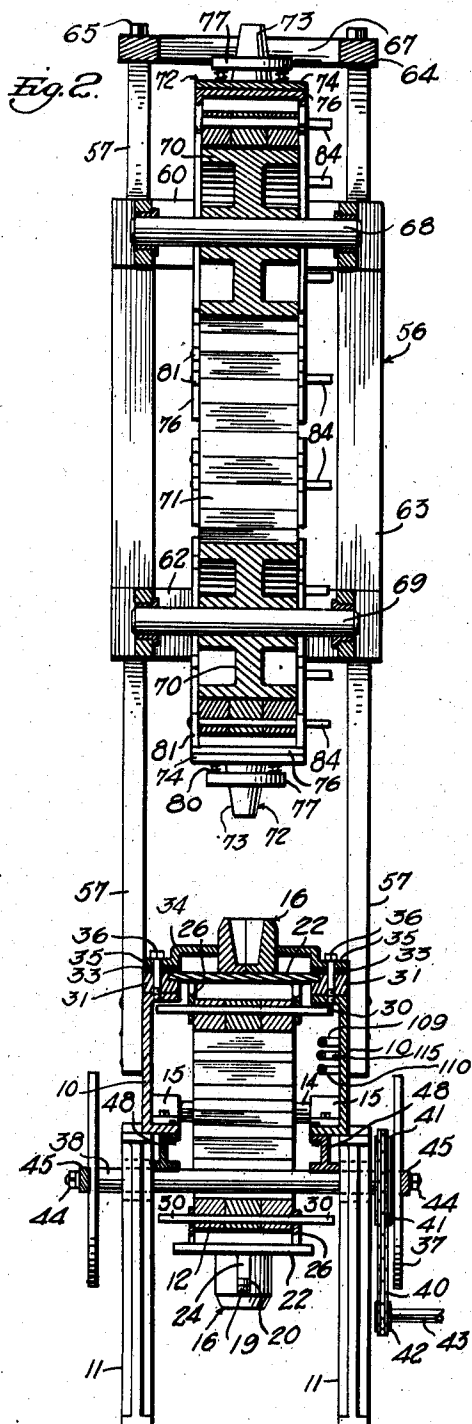
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3 Sheets-Sheet 2



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GLASS PRESSING MACHINE

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3 Sheets-Sheet 3

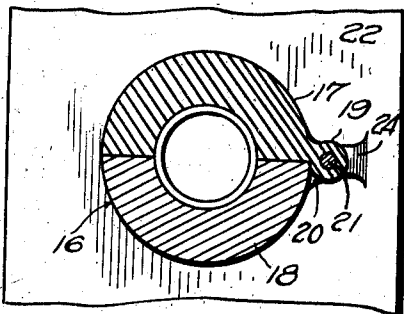
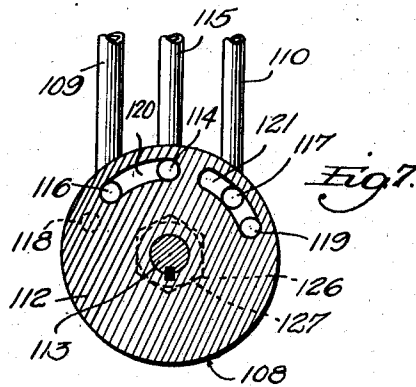
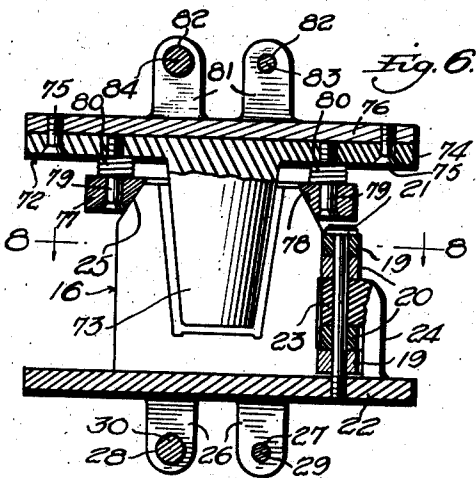
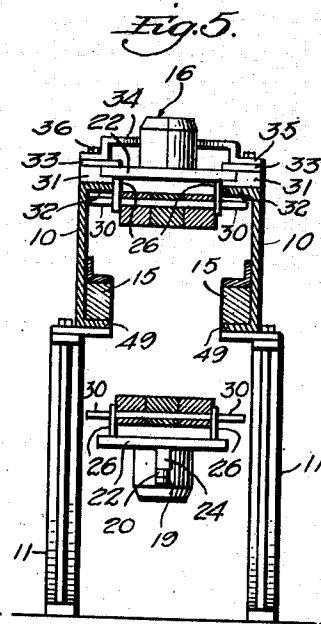
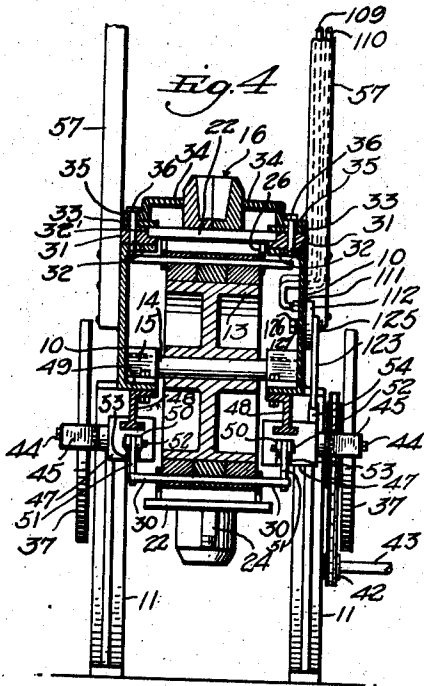


Fig. 8.

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UNITED STATES PATENT OFFICE

2,253,276

GLASS PRESSING MACHINE

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Application August 30, 1938, Serial No. 227,577

8 Claims. (Cl. 49—37)

This invention relates to a glass pressing machine, and more particularly to an automatic machine for forming pressed articles of glassware, such as water tumblers or the like.

The principal object of my invention is to provide a rapid and efficient automatic machine for forming pressed articles of glassware.

A further object of my invention is to provide an automatic glass pressing machine in which two series of complementary mold members are supported on two movable endless carriers which are relatively movable toward and away from each other to successively move the complementary mold members into and out of molding position.

Other objects and advantages of the invention will become apparent during the course of the following description.

In the accompanying drawings I have shown the preferred embodiment of my invention. In this showing:

Figure 1 is a side elevation, parts being shown in section,

Figure 2 is a vertical sectional view taken on line 2—2 of Figure 1,

Figure 3 is an end elevation,

Figure 4 is a vertical sectional view taken on line 4—4 of Figure 1,

Figure 5 is a vertical section taken on line 5—5 of Figure 1,

Figure 6 is an enlarged detail view of a pair of complementary mold members,

Figure 7 is an enlarged vertical sectional view of the compressed air distributing valve, and,

Figure 8 is a cross-section taken on line 8—8 of Figure 6.

Referring to the accompanying drawings, the numeral 10 designates a pair of spaced parallel channel members constituting the main frame of the machine. These channel members are carried by and secured to supporting legs 11. An endless link belt 12 arranged between the channel members 10 passes around a pair of sprocket members 13 mounted on shafts 14 rotatably supported in bearings 15 secured to the channel members 10 adjacent the ends thereof.

The link belt 12 carries a plurality of female mold members designated generally by the numeral 16. Referring particularly to Figures 6 and 8, each of the female mold members 16 comprises complementary portions 17 and 18 hinged together by means of a pair of lugs 19 secured to one of the complementary members and a pair of lugs 20 secured to the other complementary member, the lugs being provided with register-

ing openings to receive a hinge pin 21, the lower end of which is secured to a plate 22 which serves as a support for the mold member 16. The hinge pin 21 is held in vertical position by means of a boss 23 connected by the bracket 24 to the supporting plate 22. The complementary portions 17 and 18 of the mold member 16 are adapted to be moved toward and away from each other into closed and opened positions, respectively. The upper portion of each of the mold members 16 is bevelled circumferentially as at 25 for a purpose to be described.

Each of the mold-supporting plates 22 is provided at each side thereof with a pair of ears 26 having openings 27 and 28 to receive pins 29 and 30 which serve as connecting pins for adjacent links of the link belt 12. Each of the pins 30 is elongated to extend substantially beyond the edges of the plate 22 for a purpose to be described.

The link belt 12 is moved in a clockwise direction, in a manner to be described. During the movement of one of the molds 16 from a position adjacent the right end of the frame 10, as viewed in Figure 1, to a position adjacent the left end of the frame 10, the mold-supporting plates 22 are carried solely by the link belt 12. However, during the movement of a mold member 16 from a position adjacent the left end of the frame 10 to a position adjacent the right end of the frame 10, each supporting plate 22 is carried in rigid guide members which accurately position the supporting plates 22 with respect thereto and provide vertical support for the plates 22. The above mentioned supporting guides for the plates 22 consist of a pair of rails 31 carried by the upper flanges 32 of the channel members 10. The upper portion of the inside of each of the rails 31 is machined out as at 32' to provide horizontal faces for supporting the edge portions of the plate 22, and with vertical faces adapted to bear against the vertical faces of the plate 22 at the sides thereof to prevent transverse movement of the plates 22. Another pair of rails 33 are arranged above the rails 31, the inner ends of which overlie the edge portions of the plate 22 at the sides thereof. As will be apparent, the arrangement of the rails 31 and 33 provides a groove to receive the edge portions of the plates 22 at the sides thereof.

As heretofore described, the complementary sections of the female mold members 16 are adapted to be swung toward and away from each other into closed and opened positions, respectively. In order to maintain the molds in closed position during their movement on the upper run

of the link belt 12, I provide positive means for bearing against the sides of the molds 16. Such means consists of a pair of rails 34, the inner edges of which are spaced apart the diameter of the molds 16. The rails 34 are bent downwardly and outwardly, the outwardly extending portion 35 being arranged on the rail 33. The outwardly extending portions 35 of the rails 34, the rails 33 and the rails 31 are all secured to the upper flanges 32 of the frame 10 by means of bolts 36. As shown in Figure 5, the rails 34 are flared outwardly adjacent the left end of the machine as viewed in Figure 1.

The means for effecting the step by step movement of the link belt 12 comprises a pair of crank wheels 37 keyed to a shaft 38 mounted in bearings 39 carried by the legs 11 at the right hand end of the machine, as viewed in Figure 1. The shaft 38 is rotated by means of a sprocket chain 40 passing around a sprocket wheel 41 keyed to the shaft 38 and around a driving sprocket 42 which is rotated by the main drive shaft 43 from any suitable source of power (not shown). A crank pin 44 is secured to the outer face of each of the crank wheels 37 adjacent the periphery thereof. A pair of connecting rods 45 are pivotally secured to the crank pins 44 and, at the opposite ends of the connecting rods, to pins 46 carried by cross heads 47.

Each of the crossheads 47 consists of a metal block having a T-shaped groove machined in the upper portion thereof to receive the similarly shaped lower portion of rails 48 secured to the lower flanges 49 of the channel members 10. The rails 48 support the crossheads 47 during the reciprocation of the crossheads by means of the connecting rods 45 during rotation of the crank wheels 37. Each of the crossheads 47 is provided on its forward face with a pair of ears 50 which pivotally support the upper end of a depending lever arm 51 by means of a pin 52 passing through openings in the ears 50 and the lever arm 51. At a point below the ears 50, each of the crossheads is provided with a stop 53, the outer face of which bears against the inner edge of the lever arm 51 intermediate its length when the latter is depending in vertical position from the pin 52. The lower ends of the lever arms 51 are below the horizontal plane passing through the axis of the pins 30 in the lower run of the link belt 12 and are arranged in the path of the outwardly extended portions of the pins 30 so as to bear against such pins when the crosshead is moved from right to left, as viewed in Figure 1. While the stops 53 limit the counterclockwise movement of the arms 51 beyond the position shown in Figure 1, the lever arms 51 are adapted to be moved freely in a clockwise direction, as a result of which the lower ends of the lever arms 51 swing in a clockwise direction and pass over the outwardly extended portions of the pins 30 during the movement of the crossheads 47 from left to right, as viewed in Figure 1.

As shown particularly in Figures 1 and 4, the crosshead 47 on the front side of the machine is provided on its upper face near the inner end thereof with an upstanding lug 54, for a purpose to be described.

A spout 55 adapted to deliver molten glass to the female mold members 16 is arranged over the path of travel of the molds 16 on the upper run of the link belt 12.

A vertically movable box-like frame designated generally by the numeral 56 is slidably mounted on four upright posts 57 secured at their lower

ends to the channel members 10, the posts passing through bearings 58 formed in each of the four corners of the frame 56 at the bottom and top thereof. At the top of the frame 56, the bearings 58 are connected by front and back parallel frame members 59 and spaced parallel end frame members 60. At the bottom of the frame 56, the bearings 58 are connected by front and back parallel frame members 61 and spaced parallel end frame members 62. The upper frame, formed by the frame members 59 and 60 connected to the bearings 58, and the lower frame, formed by the frame members 61 and 62 connected to the lower bearing members 58, are spaced apart by vertical frame members 63.

The four posts 57 are connected at their upper ends by a plate 64 secured to the posts 57 by means of bolts 65. The plate 64 is provided with an overhanging portion 66 extending beyond the pair of posts 57 at the right end of the machine as viewed in Figure 1, for a purpose to be described. The central portion of the plate 64 is cut away as at 67 to provide an opening, for a purpose to be described.

A shaft 68 is journaled at its ends in the front and back frame members 59, and a similar shaft 69 is journaled at its ends in the front and back frame members 61. A pair of sprocket wheels 70 are mounted on the shafts 68 and 69. An endless link belt 71 passes over the sprocket wheels 70.

A plurality of male mold members, designated generally by the numeral 72, are carried by the link belt 71 for movement therewith. Referring particularly to Figure 6, the male mold members 72 comprise a molding element 73 formed integral with a rectangular plate 74 which is secured by suitable fastening elements 75 to a rectangular plate 76. A ring 77 having its inner face bevelled as at 78 to conform to the bevel face 25 of each of the female mold members 16, is resiliently secured to each of the plates 74 by screws 79. Coil springs 80 surrounding the screws 79 are arranged between the inner face of the ring 77 and the lower face of the plate 74 to provide for the resilient mounting of the rings 77. As will be apparent, the molding element 73 of each of the male mold members 72 is adapted to be received in the central opening of each of the female mold members 16 to provide for the molding of articles of glassware in the molds.

Each of the plates 76 is provided with a pair of ears 81 at each side thereof. The two sets of the pairs of ears 81 are spaced from each other a distance slightly greater than the width of the link belt 71, which is adapted to be received between the two sets of ears 81 at the sides of each of the plates 76. The ears 81 are provided with openings 82 adjacent the free ends thereof to receive the pins 83 and 84 connecting adjacent links of the link belt 71. Each of the pins 84 is of slightly enlarged diameter and extends beyond the belt 72' and ear 81 at the front of the machine, for a purpose to be described.

An elongated depending arm 85 is pivotally carried at its upper end by the plate 64 adjacent the forward edge thereof, as shown in Figure 1. The lower end of the depending arm 85 is arranged forwardly of the forward edge of the link belt 71 and lies in the path of the extended connecting pins 84. The bottom face at the lower end of the arm 85 is provided with a curved groove 86 which is slightly wider than the diameter of the connecting pins 84. The inner edge at the lower end of the arm 85 is curved as at

87 to provide a cam face to cause the lever arm to be swung out of the path of the extended connecting pins 84 during the downward passage of such pins adjacent the lower end of the arm 85 upon the counterclockwise movement of the link belt 71. A stop 88 carried by the plate 64 limits the swinging movement of the arm 85 inwardly and a curved leaf spring 89 tends to resiliently urge the arm 85 toward its inward position against the stop 88.

The frame 56 is adapted to be reciprocated on the posts 57 by fluid pressure means. In the embodiment of the invention shown in the accompanying drawings, the frame 56 is reciprocated by means of a pneumatic motor designated generally by the numeral 90. The pneumatic motor comprises a cylinder 91 closed at its ends by an integral end plate 92 and a detachable end plate 93. The upper end plate 92 is bolted to the extended portion 66 of the plate 64 to rigidly support the motor 90 with respect to the machine. A piston 94 connected to a piston rod 95 is adapted to reciprocate in the cylinder 91, the extent of movement in each direction being limited by the stops 96 and 97, which serve to space the faces of the piston from the end plates 92 and 93 at the limits of the movement of the piston 94.

The piston rod 95 of the pneumatic motor 90 is connected to the reciprocating frame 56 through a shock absorber designated generally by the numeral 98. The shock absorber 98 is connected at its lower end to a bracket 99 secured to the frame member 62 at one end of the frame 56. The shock absorber 98 comprises a cylinder 101 having a closure 102 at its lower end and a threaded cap 103 at its upper end, both of which closures are provided with air vents 104. The closure cap 103 is provided with a central opening to receive the piston rod 95 of the pneumatic motor 90. A cylindrical head 105 is carried by the lower end of the piston rod 95. A coiled compression spring 106 is arranged in the cylinder 101 between the upper face of the head 105 and the closure 103. A similar coiled compression spring 107 is arranged in the cylinder 101 between the lower face of the head 105 and the closure 102.

The motor 90 is adapted to be operated by compressed air in accordance with the actuation of a regulator valve, designated generally by the numeral 108. An air pipe 109 is adapted to deliver air under pressure from the regulator valve 108 into the cylinder 91 above the piston 94, and a pipe 110 connects the regulator valve 108 to the interior of the cylinder 91 below the piston 94.

Referring particularly to Figures 4 and 7, the regulator valve 108 comprises a fixed valve plate 111 secured to the outer face of the channel member 10 at the front of the machine, and a rotatable valve body 112 splined to a shaft 113 passing through the valve plate 111 and the vertical web of the associated channel member 10. The valve plate 111 is provided with a port 114 connected to a pipe 115 which, in turn, is connected to a source of compressed air (not shown). The valve plate 111 is also provided with a port 116 which is connected to the pipe 109 and a port 117 which is connected to the pipe 110. The valve plate 111 is also provided with ports 118 and 119 connected to the atmosphere. The rotatable valve body 112 is provided with a cut-out portion 120 adapted to connect the ports 114

and 116 when the parts are in the position shown in Figures 1 and 7, and to connect the ports 116 and 118 when the valve body 112 is moved in a counterclockwise direction. The valve body 112 is also provided with a cut-out portion 121 adapted to connect the ports 117 and 119 when the parts are in the position shown in Figure 7, and to connect the ports 114 and 117 when the valve body 112 is moved in a counterclockwise direction from the position shown in Figure 7.

The valve body 112 is adapted to be rotated by means of an actuating mechanism designated generally by the numeral 122. The actuating mechanism 122 comprises a bell crank lever having arms 123 and 124. The bell crank lever 122 is mounted on the shaft 113 at the point of connection of the arms 123 and 124 and is splined thereto to effect rotation of the shaft 113 upon movement of the bell crank lever 122. The bell crank lever 122 is secured in position on the threaded forward end of the shaft 113 by means of a nut 125. The rear end of the shaft 113 is also threaded to receive the nut 126. A friction washer 127 is arranged between the nut 126 and the channel member 10.

The bell crank lever 122 which serves as the actuating means for the rotatable valve body 112 of the regulator valve 108 is adapted to be swung between the full line and dotted line positions shown in Figure 1 and to be held in either of such positions by the friction provided by the friction washer 127. The movement of the bell crank lever is effected by means of the upstanding lug 54 on the crosshead 47. The full line position of the parts shown in Figure 1 shows the bell crank lever 122 in its limit of movement in a clockwise position and the dotted line position of the parts shown in Figure 1 indicates the limit of movement of the bell crank lever 122 in a counterclockwise direction. With the parts as shown in the full line position, the elements of the regulator valve 108 are in the position shown in Figure 7.

Referring to Figure 1, the lower end of the bell crank lever arm 124 is provided with a pivoted depending link 128 one edge of which is adapted to bear against a stop 129 formed on the extreme end of the lever arm 124. As will be apparent, the link 128 is held against counterclockwise movement with respect to the lever arm 124 but is free to partake of clockwise movement with respect to the lever arm 124. It will be noted that the depending link 128 is arranged in the path of the lug 54 on the crosshead 47 at a point intermediate the limits of movement of the crosshead. With the parts in the full line position shown in Figure 1, the movement of the crosshead 47 from left to right brings the upstanding lug 54 into contact with the forward edge of the link 128 causing such link to bear against the stop 129 to swing the lever arm 124 upwardly to the dotted line position shown. This movement causes the rotation of the valve body 112 of the regulator valve 108 whereby the ports 114 and 117 are bridged by the cut-out portion 121 (see Figure 7). During the return movement of the crosshead 47 from the dotted line position to the full line position shown in Figure 1, the lug 54 passes below the link 128. In the event, however, that the lever arm 124 has moved downwardly as a result of vibration, for example, the lug 54 coming in contact with the lower end of the link 128 will merely swing the link in a clockwise position to pass under

it, after which the link 128 will return to its vertical position. Further movement of the crosshead 47 toward the left brings the lug 54 into contact with the inner edge of the lever arm 123 and causes such arm to be moved from the dotted line position to the full line position shown in Figure 1. This movement restores the elements of the regulator valve 108 to the positions shown in Figure 7.

The operation of the machine is as follows:

In the production of pressed glassware, a regulated amount of molten glass is delivered through the spout 55 to one of the female mold members 16, which, at the time of delivery of the supply of molten glass thereto, is stationary at a point below the mouth of the spout 55. Thereafter, the female mold member containing its supply of molten glass is advanced in the direction of the arrow in Figure 1 to a position midway between the upright posts 57 where it is automatically stopped. At this point one of the male mold members 72 is brought downwardly to mold an article of glassware of predetermined shape between the complementary mold members. The male mold member is then automatically withdrawn by movement upwardly and the female mold member is moved away from its position in the direction of the arrow and another female mold member containing a supply of molten glass is brought into the position centrally of the upright post 57 and another male mold member is moved downwardly into molding position, this sequence of operations continuing during the operation of the machine. During the passage of the female mold members 16 along the upper run of the link belt 12, the hinged sections of the female mold members are held together by means of the rails 34. However, as soon as a mold member 16 has moved past the outer limit of the rails 34, the hinged sections of the mold members may be swung apart to permit the withdrawal of the pressed article of glassware.

As will be apparent, the female mold members 16 carried by the link belt 12 are moved in the manner described in a step by step movement, a sufficient interval between successive steps of movement being provided to allow the molding operation to be completed and the male member to be withdrawn from the female member before the next step of movement occurs. This movement is effected in the manner described below.

When the frame 56 is in its upward position, as shown in Figures 2 and 3, the crossheads 47 will be in the dotted line position shown in Figure 1, the link belt 12 and the female mold member 16 carried thereby being stationary. The depending levers 51 carried by the crossheads 47 will then be in near engagement with the opposite end portions of one of the extended pins 30, as indicated in Figure 1. The further rotation of the crank wheel 37 by means of the drive chain 40 causes the connecting rods 45 and the crossheads 47 to be moved toward the left toward the full line position shown in Figure 1. Due to the fact that the stops 53 prevent movement of the depending levers 51 in a counterclockwise direction, as viewed in Figure 1, the movement of the depending levers 51 toward the left causes the link belt 12 to be moved in the direction of the arrows in Figure 1 until the crossheads have reached their limit of movement toward the left, thereby advancing the link belt 12 a distance equal to the distance between adjacent connecting pins 30. Further rotation of the crank wheels 37 causes the crossheads 47 to be moved

toward the right, as viewed in Figure 1. Due to the fact that the depending levers 51 are free to swing in a clockwise direction, the lower ends of the levers 51 pass over the extended portions of the pin 30 which the depending levers contact during the movement of the crossheads 47 from left to right and, at the limit of movement of the crossheads, assume the position indicated by the dotted lines in Figure 1. Further rotation of the crank wheel 37 advances the link belt another step forward in the manner described above.

When the parts are in the dotted line position shown in Figure 1, the link belt 12 is stationary with one of the female mold members 16 in a position to receive one of the male mold members 72. Under the conditions described, the frame member 56 is in its upper position with one of the male members 72 located directly above one of the female mold members 16. Under the condition specified, the bell crank lever 122 associated with the regulator valve 108 will be in the dotted line position shown in Figure 1. In this position, the elements of the valve 108 serve to connect the upper end of the cylinder 91 of the pneumatic motor 90 to the atmosphere and the lower end of the cylinder 91 to air under pressure, which serves to hold the piston 94 in its upper position indicated by dotted lines in Figure 1. The frame 56 is thus held in its upper position. As the crossheads 47 are moved toward the left, the upstanding lug 54 on the crosshead 47 at the front of the machine comes in contact with the lower end of the arm 123 of the bell crank lever 122 and moves the arm 123 from the dotted line position to the full line position shown in Figure 1. This rotates the body 112 of the valve 108 in a clockwise direction to bring the valve elements into the position shown in Figure 7. In this position the ports 114 and 116 are bridged by the cut-out portion 120 and air under pressure is delivered from the supply pipe 115 to the pipe 109 connected to the upper end of the cylinder 91, thereby admitting air under pressure on the top of the piston 94. At the same time, the port 117 is connected to the atmospheric port 119 by means of the cut-out portion 121 of the valve element 112, thereby connecting the lower end of the cylinder 91 to the atmosphere. As a result of these connections, the piston 94 is forced downwardly by compressed air in the cylinder 91. As soon as the piston 94 starts to move downwardly, the frame 56 moves downwardly under the force of gravity until the ring 77 of one of the male mold members 72 comes in contact with the upper edge of one of the female mold members 16. Further movement of the piston 94 serves to compress a spring 107 of the shock absorber 98. After substantial compression of the spring 107, the downward movement of the piston 94 serves to resiliently force the frame 56 downwardly to a further extent. After the ring 77 contacts with the upper end of the female mold member 16, further downward movement of the frame 56 serves to compress the springs 80 between the ring 77 and the plate 74. In this manner, the male mold member 73 is resiliently urged into molding position with the core of the female mold member 16. As will be apparent, the bevelled inner edge of the ring 77 bearing against the bevelled upper edge of the female mold member 16 serves to center the male mold member 73 in the female mold member 16 and also functions to prevent any movement of the hinged sections 17 and 18 of the mold member 16 away from each other.

While the molding operation is taking place in the manner described above, the crossheads 47 are being moved from the full line position shown in Figure 1 toward the right, the speed of rotation of the crank wheel 37 being regulated to allow for the downward movement of the frame 56 and the completion of the molding operation before the upstanding lug 54 carried by the crosshead 47 at the front of the machine comes in contact with the depending link 128 carried by the lower end of the arm 124 of the bell crank lever 122. After the upstanding lug 54 has come in contact with the link 128, which bears against the stop 129, further movement of the lug 54 toward the right serves to swing the lever arm 124 upwardly, bringing the bell crank lever 122 in the dotted line position shown in Figure 1, following which the lug 54 continues to move toward the right for a purpose to be described.

When the bell crank lever 122 is rotated in a counterclockwise direction in the manner described above, the movable element 112 of the regulator valve 108 is rotated to connect the pipe 110 to the compressed air supply pipe 115 and to connect the pipe 109 to the atmosphere through the port 116, the cut-out portion 120 and the port 118. As a result of these connections, the upper end of the cylinder 91 is connected to the atmosphere and air under pressure is admitted to the lower end of the cylinder 91 below the piston 94, which serves to move the piston 94 upwardly. The first increment of movement of the piston 94 serves to compress the spring 106 between the cap 103 and the head 105 carried by the lower end of the piston rod 95 for the purpose of starting the upward movement of the frame 56 without shock. Further upward movement of the piston 94 causes the upward movement of the frame 56 to move the male member 72 away from the female member 16. The movement of the frame upwardly continues until the piston 94 reaches the dotted line position shown in Figure 1.

As pointed out above, the lower end of the lever arm 124 associated with a regulator valve 108 is arranged at a point intermediate the limits of movement of the upstanding lug 54 carried by the front crosshead 47. The purpose of this is to provide for the actuation of the bell crank lever 122 to move the frame 56 upwardly before the front crosshead 47 has been moved to its limit of movement toward the right to bring the depending levers 51 into driving contact with the extended ends of one of the pins 30. The purpose of this is to provide for the upward movement of the frame 56 to a sufficient extent to cause the male mold member 73 to "clear" the top of the female mold member 16 before the link belt 12 is operated to move the latter.

As described above, the lower end of the arm 85 lies in the path of the forwardly extending portions of the connecting pins 84 of the link belt 71. However, when the frame 56 is in its lowermost position, as shown in Figure 1, the lower end of the arm 85 is spaced from the pin 84 next below it a distance at least equal to the distance from the top of one of the female mold members 16 to the bottom of the male mold member 73. As a result, the frame 56 may be moved upwardly a sufficient distance for the lower end of the male mold member 73 to "clear" the upper end of the female mold member 16 before the pin 84 comes into contact with the inner edge of the groove 86. However, further upward move-

ment of the frame 56 causes the pin 84 to bear against the lower end of the arm 85 to cause the link belt 71 to be moved with respect to the frame 56. The frame 56 is adapted to be moved upwardly, after contact of the pin 84 with the lower end of the arm 85, a distance equal to the distance between the centers of the adjacent female mold members 72. Thus, when the frame 56 has reached its upper limit of movement, one of the male mold members 72 has been moved from the molding position below the shaft 69 toward the right, as viewed in Figure 1, and the next following mold member 72 has been moved to a position below the shaft 69, this sequence of operation continuing during the operation of the machine. As a result, each of the male mold members 73 is permitted to cool down to atmospheric temperature before it again functions in the molding operation.

After the frame 56 has reached its upper limit of movement and the link belt 71 has been moved in the manner described above, the parts are in a position for the frame 56 to be moved downwardly for a successive molding operation. At this point, the upstanding lug 54 has been moved by the front crosshead 47 to a position in contact with the arm 123 of the bell crank lever 122, and further movement of the front crosshead 47 toward the left moves the arm 123 from the dotted line position to the full line position shown in Figure 1, as a consequence of which the frame 56 is again moved downwardly by the pneumatic motor 90 in the manner described above.

While I have described in detail the preferred embodiment of my invention it is to be understood that the shape, size, and arrangement of parts may be variously modified without departing from the spirit of the invention or the scope of the subjoined claims.

I claim:

1. A molding machine comprising a pair of conveyors, a plurality of mold members carried by one of said conveyors, a plurality of two-part mold members carried by the other conveyor, stationary means between and in engagement with which said last named mold members move during a portion of their travel to be maintained in closed position, means for effecting relative movement of said conveyors toward and away from each other, means for effecting step by step movement of each of said conveyors during the relative movement thereof away from each other, and means operating coincidentally with the means for effecting step by step movement of one of said conveyors for rendering operative the said means for effecting relative movement of said conveyors toward and away from each other.

2. A molding machine comprising a pair of conveyors, a plurality of mold members carried by one of said conveyors, a plurality of two-part mold members carried by the other conveyor, stationary means between and in engagement with which said last named mold members move during a portion of their travel to be maintained in closed position, pneumatic means for effecting relative movement of said conveyors toward and away from each other, means for effecting step by step movement of each of said conveyors during the relative movement thereof away from each other, and means operating coincidentally with the means for effecting step by step movement of one of said conveyors for rendering said pneumatic means operative.

3. A molding machine comprising a conveyor,

a two-part mold member carried thereby, a reciprocable complementary mold member adapted to be moved into and out of molding relationship with said first named mold member, means for reciprocating said reciprocable mold member, means for moving said conveyor to bring said first named mold member into and out of registration with said second named mold member, and stationary means between and in engagement with which said two-part mold member moves into and out of registration with said second named mold member to be maintained in closed position.

4. A molding machine comprising a conveyor having a plurality of two-part mold members carried thereby and adapted to partake of a step by step movement to successively bring said mold members into a predetermined position, a reciprocable complementary mold member adapted to be moved into and out of molding relationship with one of said first named mold members when the latter is in said predetermined position, stationary means between and in engagement with which each two-part mold member travels to and past said reciprocable mold member to be maintained in closed position, means for effecting reciprocation of said reciprocable mold member, control means for rendering said last named means operative, and common means for causing actuation of said control means and for effecting the said step by step movement of said conveyor.

5. A molding machine comprising a support having a two-part mold member carried thereby and movable from a mold-charging position into a molding position, a reciprocable complementary mold member adapted to be moved into and out of molding relationship with respect to said first named mold member when the latter is in molding position, stationary means between and in engagement with which said two-part mold member moves into and out of registration with said second named mold member to be maintained in closed position, means for reciprocating said reciprocable mold member, control mechanism for said last named means, and common means for causing actuation of said control mechanism and for effecting the said movement of said support.

6. A molding machine comprising an endless conveyor, a plurality of two-part mold members carried thereby, driving mechanism including means for effective step by step movement of said conveyor to move said mold members successively into a predetermined position, stationary means between and in engagement with which each two-part mold member travels to and past said predetermined position to be maintained in closed position, a second endless conveyor mounted above said first named conveyor, a plurality of complementary mold members car-

ried by said last named conveyor, means for moving said second named conveyor toward and away from said first named conveyor, control means for rendering said last named means operative, means operated by said driving mechanism for actuating said control means, and automatic means operable upon the upward movement of the second named conveyor to move one of the complementary mold members carried thereby into registration with one of said first named mold members when the latter is in said predetermined position.

7. A molding machine comprising a pair of endless conveyors, a plurality of mold members carried by one of said conveyors, a plurality of two-part mold members carried by the other conveyor, each of said conveyors being movable in a step by step movement to bring a mold member on one of said conveyors into registration with a mold member on the other conveyor, stationary means between and in engagement with which each two-part mold member travels to and past its position in registration with one of said first named mold members to be maintained in closed position, means for bodily moving one of said conveyors toward and away from the other of said conveyors to move the mold members which are in registration into and out of molding relationship, and common means for effecting the step by step movement of one of said conveyors and for rendering effective the said means for moving the other conveyor toward and away from the first named conveyor.

8. A glass molding machine comprising a horizontal frame, a pair of sprockets mounted in said frame, an endless conveyor passing around said sprockets and supported thereby, a plurality of two-part mold members carried by said conveyor, a second frame supported for reciprocation above said conveyor, an endless conveyor carried by said second frame, a plurality of complementary mold members carried by said second named conveyor, driving mechanism including means for moving said first named conveyor in a step by step movement to successively bring the mold members carried thereby into a predetermined position and arrest the movement of the same in such position, stationary means between and in engagement with which each two-part mold member travels to and past said predetermined position to be maintained in closed position, a fluid motor for raising and lowering said reciprocable frame, a valve for delivering fluid under pressure to said fluid motor, valve actuating mechanism operated by said driving mechanism, and automatic means operable on the upward movement of said second frame to impart step by step movement to the conveyor carried thereby.

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