Jan. 31, 1933. T. STENHOUSE 1,895,824

TRANSFER APPARATUS FOR GLASSWARE

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Fig. 1.

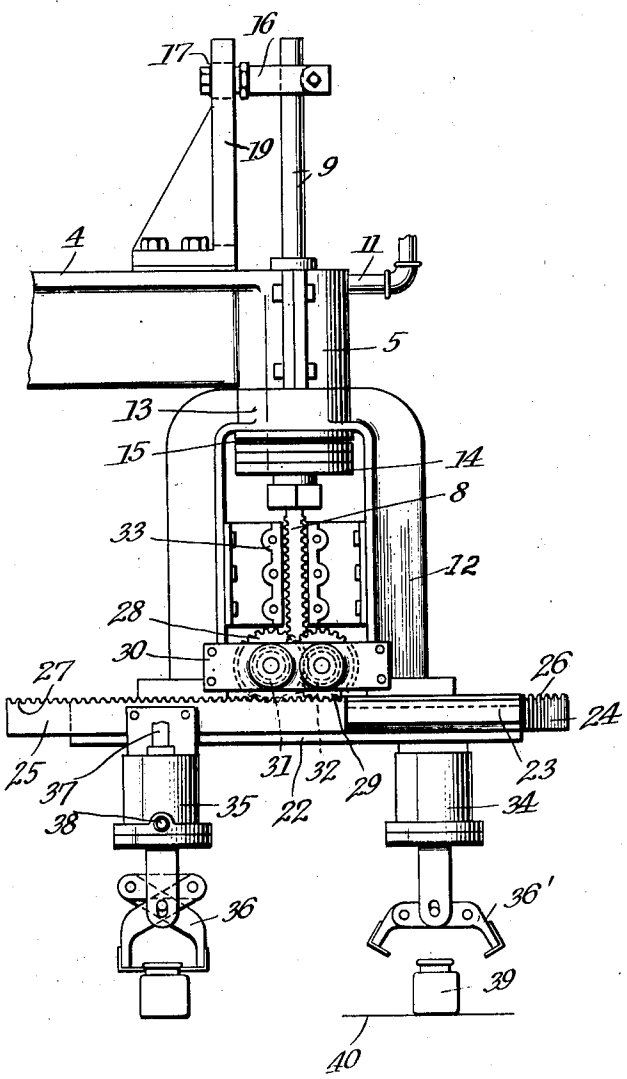
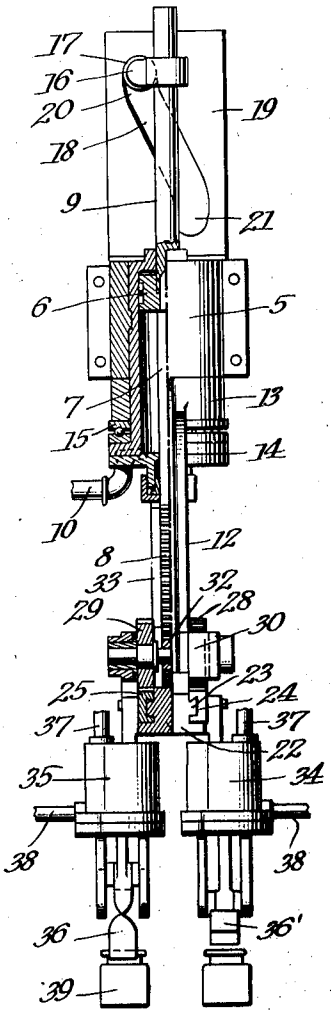


Fig. 2.



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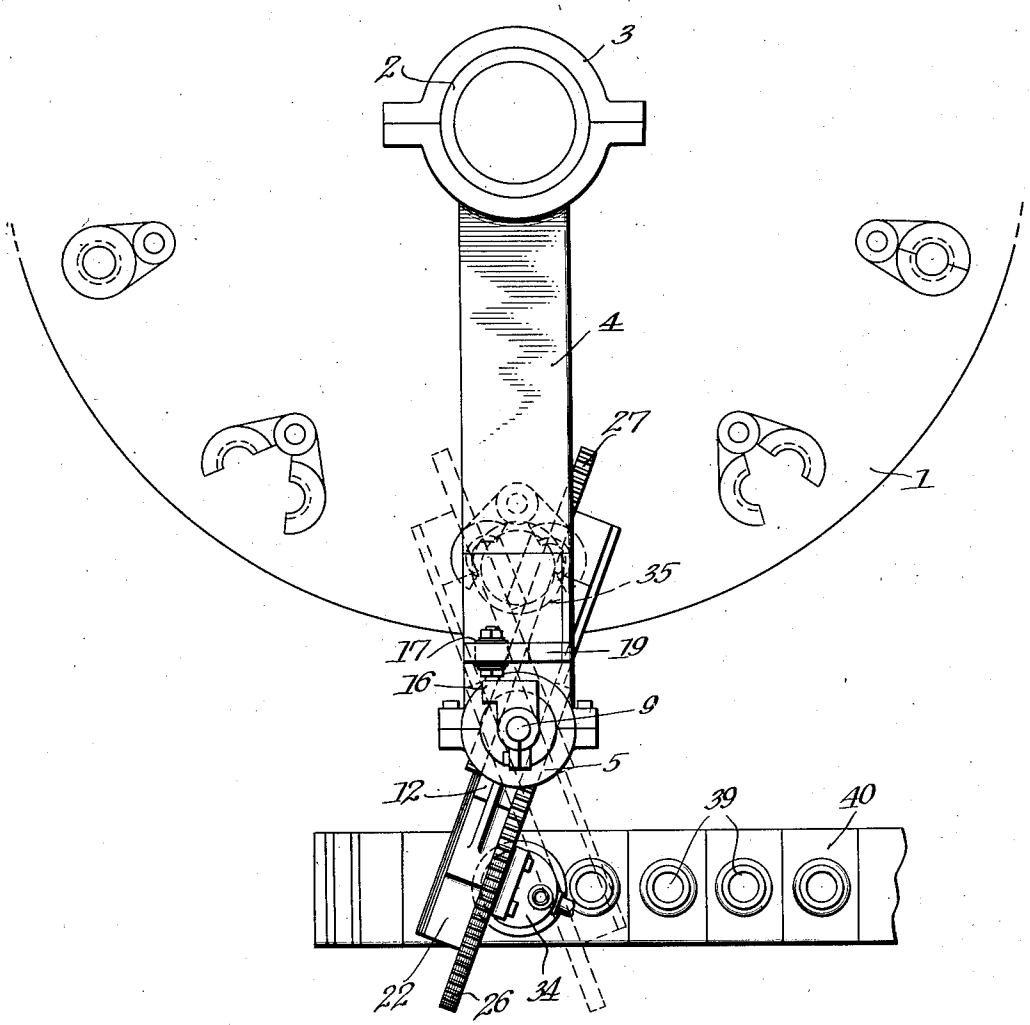
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Fig. 3.



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UNITED STATES PATENT OFFICE

THOMAS STENHOUSE, OF WASHINGTON, PENNSYLVANIA, ASSIGNOR TO HAZEL-ATLAS GLASS CO., OF WHEELING, WEST VIRGINIA, A CORPORATION OF WEST VIRGINIA

TRANSFER APPARATUS FOR GLASSWARE

Application filed December 1, 1928. Serial No. 323,016.

This invention relates to mechanisms for transferring glassware and the like from a forming machine to a leer conveyor or to a conveyor associated with a leer. One of the primary objects of the invention resides in the provision of a substantially duplex construction which is operated from a common source, and whereby the number of power strokes necessary to the transfer of a given number of articles is reduced by 50%.

A further object of the invention resides in the provision of such a device which, by reason of the reduced number of operative movements, and their consequent reduction in speed of movement, is practically free from vibration, thereby greatly reducing wear and tear on the mechanism and eliminating careening of the ware which commonly occurs in previously known transfer devices.

A further object of the invention is to provide a transfer mechanism of this character which will rapidly and efficiently transfer ware from a forming machine to a conveyor without the necessity of lifting the ware vertically either at the beginning of or during the transfer operation.

Another object of the invention is to provide a transfer mechanism having greater capacity than those previously known, thus making possible a further increase in the speed of the forming machines.

Another object of the invention consists in the provision of a reliable and efficient transfer mechanism in which the power consumption is reduced practically 50% below that of previously known devices.

Other objects and advantages of the invention will be apparent from the following description when taken in connection with the accompanying drawings; in which

Figure 1 is a side elevational view of the mechanism.

Figure 2 is an end elevational view thereof partly in section; and

Figure 3 is a plan view of the apparatus mounted on the main pedestal of a forming machine in cooperative relationship with a conveyor and showing in dotted and full lines the two radial positions which are alternately assumed by the transfer mechanism.

The forming machine, which may be of any desired construction, is indicated by the numeral 1, and is provided with the usual pedestal or column 2. Mounted upon the column 2 as by means of clamp 3 is a bracket 4 which serves as a support for the transfer mechanism.

Bolted to the outer end of the bracket 4 is a position substantially midway between the mold at take-out position and the conveyor is a vertically disposed cylinder 5. This cylinder is provided with a piston 6 and piston rod 7, the latter being provided with a double rack 8 on its lower end, and an extension 9 on its upper end, for purposes which will appear as the description proceeds. The cylinder is provided with air connections 10 and 11 for admitting the motive power.

A yoke 12, which forms the immediate support for the transfer mechanism, is provided with a ring portion 13 which encircles the lower end of cylinder 5. The lower cylinder head 14 forms a support for a ball race 15 so as to provide an antifriction thrust bearing for the yoke 12 and allow it to be oscillated about its axis through movements of the piston rod extension 9. For this purpose the extension 9 has clamped thereto an arm 16 carrying a roller 17 for cooperation with a cam slot 18 in a bracket 19. This bracket is bolted on the end of bracket 4 adjacent the cylinder 5, and the angle at which the slot 18 is cut is such as to impart a slight oscillatory movement to the yoke 12 and the parts carried thereby as the piston 6 is raised and lowered. It is to be particularly noted, however, that the upper and lower ends 20 and 21 of the slot 18 extend vertically so that no movement whatever is imparted to yoke 12 during the preliminary movement of piston 6 in either its upward or downward stroke. This feature is of material importance in the practical operation of the apparatus, as will appear latter.

Secured to the lower end of the yoke 12 is a horizontal guide bar 22 provided on its opposite sides with guideways 23 on which are slidably mounted two plates 24 and 25. These plates are formed with racks 26 and 27 on their respective upper edges which cooperate with

pinions 28 and 29 mounted on a bearing member 30 bolted to yoke 12. Also mounted on bearing member 30 and fixed to the shafts carrying pinions 28 and 29 are pinions 31 and 32 which cooperate with the double rack 8 carried by the lower end of piston rod 7. It will thus be apparent that as the piston 6 is raised and lowered by the admission of motive fluid to opposite ends of cylinder 5, the double rack 8 and its associated gearing will cause the two plates 24 and 25 to be moved in opposite directions, i. e., as the plate 25 is moved to the right (Fig. 1) the plate 24 will move to the left, and vice versa. The rack 8 is guided in its vertical movements by a slide bearing 33 bolted to the yoke 12, and which serves to transmit the oscillating movements of rod 9 to the yoke.

Each of the plates 24 and 25 carries a conventional type of bottle gripping mechanism, consisting of operating cylinders 34 and 35 and gripper arms indicated by numerals 36 and 36′. The motive fluid for these cylinders is admitted to the opposite ends thereof by conduits 37 and 38, and as the pistons are raised and lowered the gripper arms 36 and 36′ are closed and opened in the usual manner to grip or release a piece of ware.

The bottles, or other ware, which is to be transferred to a conveyor by the present mechanism, are indicated by the numeral 39 and the conveyor on which the ware is placed in uniformly spaced relationship is designated by the numeral 40.

Having fully described the detailed construction of the present mechanism, I shall now set forth the operation of the several parts in their proper sequence in taking a piece of ware from a mold on the forming machine and placing it on the conveyor.

Assuming the parts are in the positions indicated in Figure 1, the gripper arms 36 have just engaged a piece of ware, while the gripper arms 36′ have just released another piece of ware on the conveyor 40. Air is now admitted to the upper end of cylinder 5 so as to cause the piston 6 and related parts to descend. This downward movement will cause the plates 24 and 25 to move in opposite directions so that the ware engaging units 34 and 35 will exchange places with respect to the forming machine and conveyor. At the initiation of the downward movement no rotative movement is imparted to the yoke 12 for the reason that the cam slot 20 extends vertically. It will thus be apparent that the ware in the open mold is moved radially therefrom and no lifting movement is necessary in order that the ware may clear the walls of the mold. By the time the plate 25 has moved a sufficient extent to remove the ware from the mold the roller 17 engages the inclined portion 18 of the cam slot and thus swings the transfer mechanism about its vertical axis so that as the plate 25 reaches the limit of its movement to the right its unit 35 will occupy the identical position which was just vacated by the unit 34 on plate 24. This oscillatory movement is necessary in order that the ware may be equally spaced on the conveyor and in order that both of the ware engaging units may be properly centered over the mold at the take-out position. In this connection it should be noted that the units 34 and 35 are disposed on the opposite sides of their respective plates 24 and 25 and that the distance between their center lines of travel is identical with the oscillatory movement imparted to the mechanism.

As the plate 25 approaches the limit of its travel to the right, the cam roller 17 enters the vertical portion 21 of the cam slot and the final movement of the plate is thus a rectilinear one as it brings the ware to rest over the conveyor 40. Air is now admitted to the upper end of cylinder 35 so as to open the grippers 36 and release the ware.

During this movement of plate 25, the plate 24 has moved in a reverse direction so as to bring the gripping unit 34—36′ over the next succeeding mold arriving at the take-out position. The travel of the cam roller 17 and the consequent oscillation of yoke 12 has, of course, also swung the plate 24 and its unit 34—36′ through a predetermined angle so as to return the same to the identical position from which it had left on the previous cycle of operations, namely, over the mold in take-out position. Air is admitted to the lower end of cylinder 34 to cause its grippers 36′ to engage the bottle in the mold, simultaneously with the opening of grippers 36 to release a transferred article. When this operation is completed air is admitted to the lower end of cylinder 5 so as to raise piston 6, and the positions of the plates 24 and 25 are again shifted so as to return them to the positions assumed at the beginning of the description of operation of the mechanism. These cycles are continued throughout the operation of the forming machine, and the air lines are controlled by the usual valves associated with the mechanism of the forming machine, so that the parts remain at all times in exact synchronization with the movements of the forming machine.

From the foregoing description and the accompanying illustration of the mechanism, it will be apparent that the number of reciprocations of the piston 5 is reduced one-half in transferring a given number of articles from the forming machine to the conveyor, with a consequent reduction in the vibration of the mechanism, thereby resulting in less liability of the articles careening when placed on the conveyor. Through the use of this mechanism also, the forming machine itself may be speeded up without unduly straining the transfer mechanism and with a lesser amount of vibration in the transfer mechanism than

in prior devices. It will also be apparent that no lifting of the ware is necessary in transferring the ware to the conveyor, and that by reason of the duplex mechanism here disclosed the power consumption is very materially reduced.

In accordance with the patent statutes I have described what I believe to be the preferred embodiment of the invention; inasmuch, however, as various modifications may be made in the details of construction without departing from the spirit of the invention, it is intended that all such modifications be included within the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. A device for transferring glassware, including two complete gripping units, means for simultaneously reciprocating the units in opposite directions in a horizontal plane, and means for oscillating the units in a horizontal plane to alternately bring both units to the same point for delivery.

2. A device for transferring glassware, including two complete gripping units, carriages upon which said units are mounted, means for reciprocating the carriages in opposite directions in a horizontal plane, and means for oscillating the carriages in a horizontal plane during the reciprocation to bring both carriages to the same point for picking up the ware.

3. A device for transferring glassware, including two complete gripping units, means for simultaneously moving the units in opposite directions in a horizontal plane, and means for changing the direction of movement during the movement to bring both units to the same pick-up and delivery positions.

4. A transfer device including two complete gripping units, a carriage for each unit, means for simultaneously reciprocating the units and carriers in opposite directions in substantially a horizontal plane, and means causing each unit and carrier to successively occupy the identical position vacated by the other unit and carrier.

5. A transfer device including two complete gripping units arranged side by side, means for simultaneously reciprocating the units in opposite directions in substantially a horizontal plane, and means causing each unit to assume the position of the other unit at pick-up and delivery positions.

6. A transfer device including a guide member, a plurality of complete gripping units adapted to simultaneously travel in opposite directions on the guide member, a single cylinder for effecting the simultaneous movement in opposite directions, and each unit including a cylinder for operating the grippers.

7. A transfer device including a guide member, a plurality of complete gripping units adapted to travel in opposite directions on the guide member, a cylinder and piston rod, a rack carried by said piston rod and operatively connected with the units to cause the units to simultaneously travel in opposite directions.

8. A transfer device including a guide member arranged in a horizontal plane, plates slidably mounted on the sides of the guide member, a cylinder and grippers mounted on each plate, a rack on each plate, a gear meshing with each rack, a double rack operatively associated with said gears to cause the cylinders to simultaneously travel in opposite directions, and a cylinder for reciprocating the double rack.

9. A transfer device including a guide member arranged in a substantially horizontal plane and mounted for oscillatory movement, two gripping units adapted to simultaneously reciprocate in opposite directions on said guide member, and a cylinder and piston for oscillating the guide member and bringing both units to the same point for pick-up and delivery.

10. A transfer device including a guide member arranged in a substantially horizontal plane, a gripping unit slidably mounted on said guide member, a cylinder and piston rod operatively connected with the guide member, a bracket having a cam slot adjacent the piston, a roller carried by the piston and engaging said slot, said cam slot designed to oscillate the piston rod during its reciprocation.

11. A transfer device including a vertically arranged cylinder, a depending bracket mounted on said cylinder and adapted to oscillate, a horizontally arranged guide member carried by said bracket, two gripping units slidably mounted on the guide member and adapted to reciprocate simultaneously in opposite directions, two piston rods operated by the said cylinder, one of the piston rods projecting downwardly and the other projecting upwardly, a double rack carried by the downwardly projecting piston rod and adapted to effect the simultaneous reciprocation of the two gripping units in opposite directions, and a cam operatively connected with the upwardly projecting piston rod and adapted to effect the oscillation of the bracket.

THOMAS STENHOUSE.