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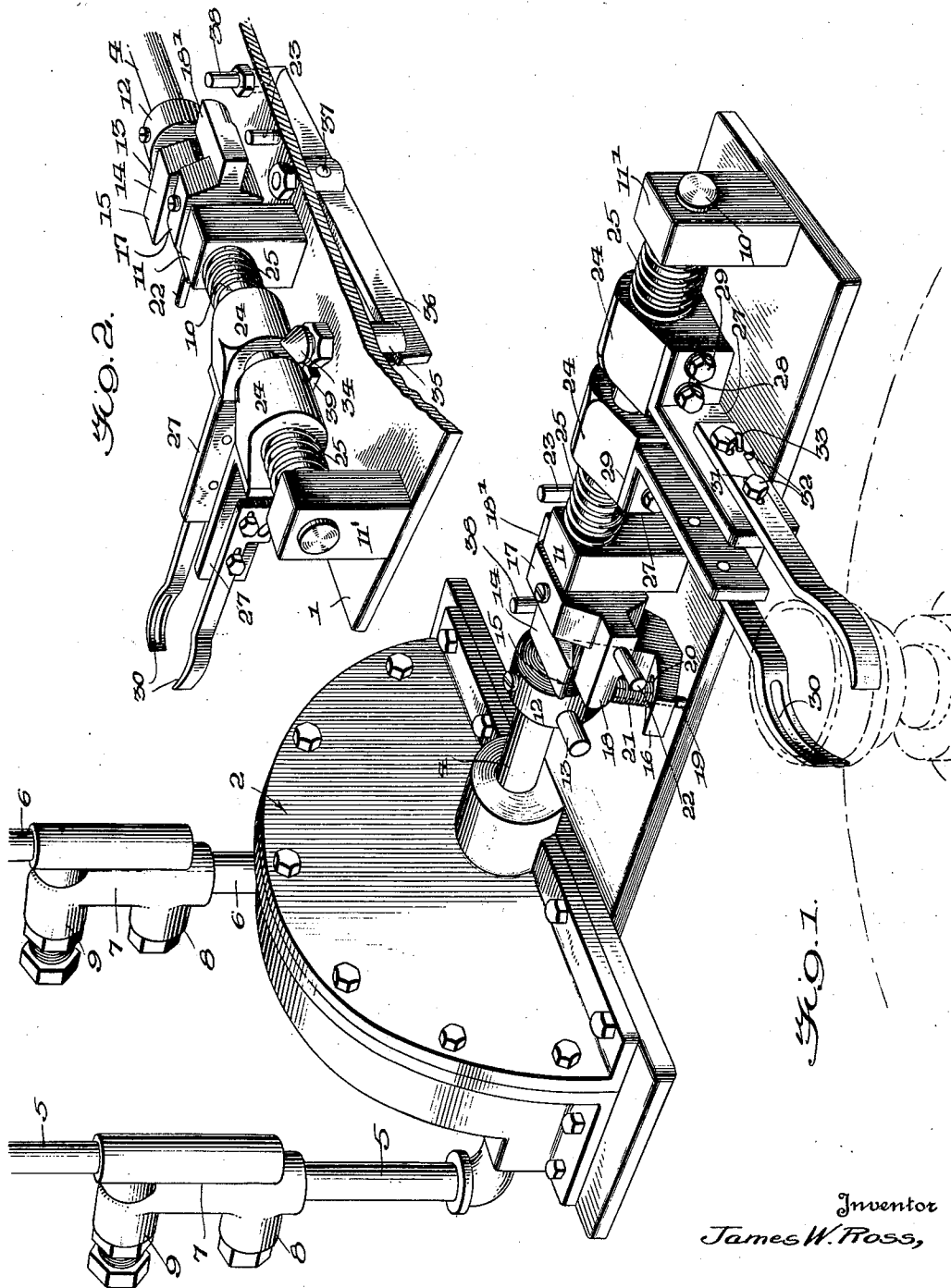
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TAKE-OUT MECHANISM FOR GLASS FORMING MACHINES

Filed June 23, 1927

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

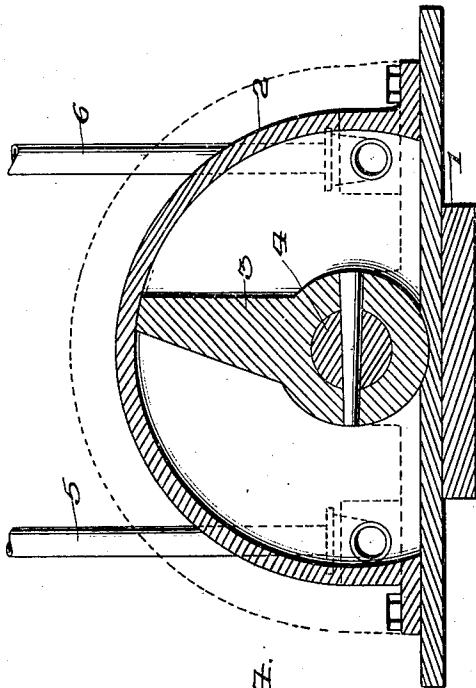


Fig. 7.

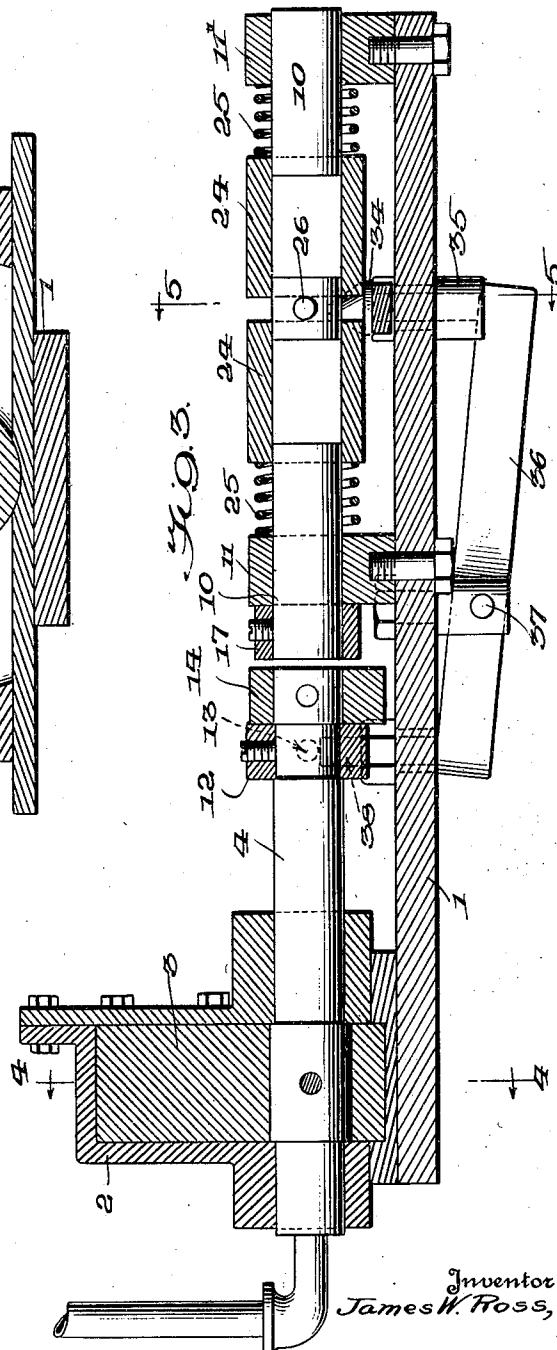


Fig. 5.

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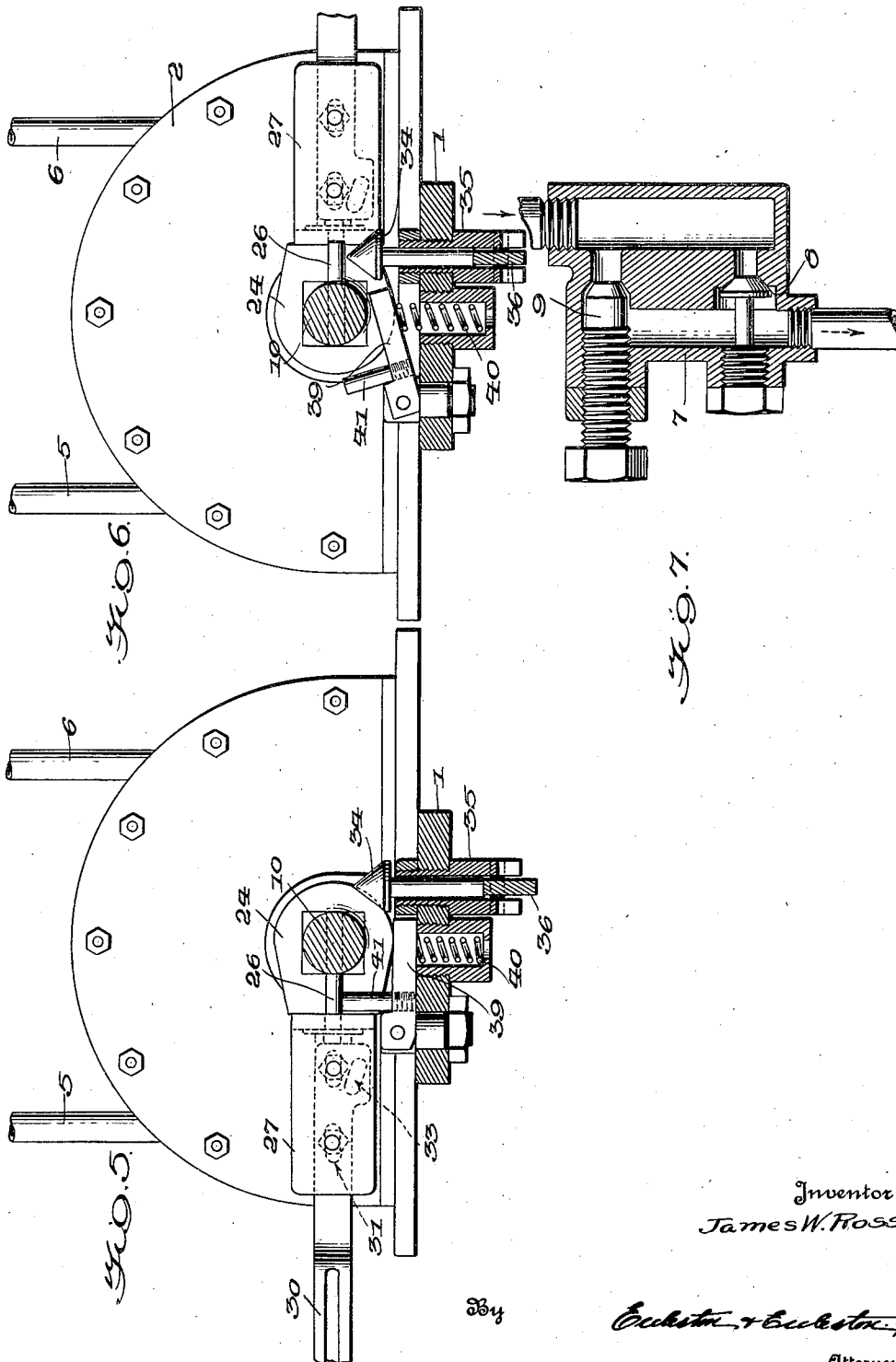
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TAKE-OUT MECHANISM FOR GLASS FORMING MACHINES

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3 Sheets-Sheet 3



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TAKE-OUT MECHANISM FOR GLASS FORMING MACHINES

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The invention relates generally to a device for removing ware from a forming machine and delivering it onto a conveyer or elsewhere. Devices for performing this function have been devised heretofore, but such prior devices have been rather expensive to manufacture, because of their relatively complex construction. Further, such prior devices have been costly to operate, because of their heavy consumption of compressed air or other motive fluid. Further, such prior devices were more or less limited as to speed of operation, and consequently were not suitable in connection with machines operating at a high rate of production.

Accordingly, the object of the present invention is to provide a device of this character, which is inexpensive in construction, economical and efficient in operation, and capable of operation with forming machines operating at a high rate of production.

Various other advantages of the invention will be apparent from the following detailed description, when taken in connection with the accompanying drawings; in which

Figure 1 is a perspective view of the apparatus.

Figure 2 is a perspective view of a portion of the device, viewed from the opposite side to that in Figure 1.

Figure 3 is a vertical longitudinal sectional view of the device.

Figure 4 is a vertical transverse sectional view of the operating cylinder.

Figure 5 is a vertical sectional view taken on line 5-5 of Figure 3, with the parts in take-out position.

Figure 6 is a view similar to Figure 5, but showing the parts at the delivering position; and

Figure 7 is a detail sectional view of the check valve which is preferably employed.

Referring to the drawings more in detail, numeral 1 indicates the base plate upon which the complete device is mounted. In practice, the base plate is so mounted that it may be adjusted vertically or laterally, but the base plate may be mounted in any desired manner, and consequently I have deemed it unnecessary to illustrate the particular preferred

mounting. The operating cylinder for the take-out mechanism is indicated by numeral 2, and is secured to the base plate 1. It is to be noted particularly that this take-out mechanism employs only one cylinder.

In place of the usual reciprocating piston, I employ an oscillating piston, as indicated by numeral 3. This piston is fixed to and adapted to oscillate a rod 4. For the purpose of oscillating the piston rod back and forth, compressed air or other motive fluid is alternately admitted and exhausted at opposite ends of the cylinder, beneath the piston; the air lines being indicated by numerals 5 and 6, and each line provided with a control valve 7. The purpose of these valves is to control the rate of admission or exhaust of the motive fluid, to thereby control the speed of the oscillating movement and also to provide a cushioning effect for the piston at each end of its stroke. Any suitable valve may be used for this purpose, but the particular valve I employ is illustrated in detail in Figure 7. By reference to this figure it will be noted that incoming air, moving in the direction of the arrows, has free access to the cylinder, by reason of unseating the check valve 8. Upon exhaust, however, the check valve will close in the usual manner, so that the air must pass through the adjustable needle valve 9, whereby the exhaust may be regulated to control the movement of the piston and the take-out mechanism operated thereby. By reversing this valve in the line, substantially the same result is obtained by regulating the admission of the compressed air.

It will be understood, of course, that the take-out mechanism operates in timed relation with its forming machine, and accordingly it will be understood that the air lines are provided with valves (not shown) which are operated by the usual timing shaft (not shown) to control the supply and exhaust of compressed air to opposite ends of the cylinder 2, in timed relation with the operation of the various elements of the forming machine.

While I prefer to employ this oscillating piston which oscillates the rod 4, which in turn operates the take-out mechanism in a

manner to be described hereinafter; yet it will be understood that the invention is not limited to this type of cylinder. Obviously various other means could be employed for producing the desired oscillation of the rod; for instance, the rod could be provided with a pinion rotated in opposite directions by a rack driven by an ordinary reciprocating piston. Needless to say, the invention contemplates the use of any desired means for oscillating the rod 4.

The oscillatable piston rod 4 extends only a short distance, and arranged in alignment therewith is a shaft 10 which carries the grippers; the shaft being mounted in appropriate bearings 11, 11'. As will be indicated hereinafter, the grippers may be carried directly by the oscillatable piston rod, but in the preferred embodiment disclosed herein, I employ a separate shaft, and connect the rod and shaft by means of a resilient clutch, which will now be described.

Secured to the oscillatable piston rod 4 by set screws or otherwise, is a collar 12, provided with a radially projecting pin 13; which pin is adapted to operate the jaw-opening mechanism, in a manner to be described hereinafter. Pinned or otherwise secured to the end of the piston rod 4 is a clutch block 14 having thereon spaced laterally projecting abutments 15 and 16. Mounted on the adjacent end of the shaft 10, is a clutch dog 17, provided with fingers 18, 18'. As clearly shown in Figure 1 the finger 18 projects between the abutments 15 and 16. The finger 18' has no function in this machine, and is provided so that the device may be readily changed from a right hand machine to a left hand machine, and vice versa. The finger 18, which projects between the abutments 15 and 16, is provided with a pin 19 projecting through a slot 20 in the abutment 16; and a coil spring 21 is mounted on this pin between the finger 18 and the abutment 16.

Referring now to Figure 1, it will be seen that when the piston rod 4 starts to rotate in a clockwise direction to carry the grippers from the take-out position, as shown, to the delivery position, the spring 21 will transmit the pressure from the abutment 16 carried by the piston rod 4, to the finger 18 carried by the shaft 10; and hence the piston rod and shaft will rotate in unison. After the rod and shaft have rotated 180° to bring the grippers to delivery position, the shaft 10 is brought to a stop by any desired means, as by a pin 22 carried by finger 18 striking a vertically adjustable lug 23 mounted on the base plate 1. Further rotation of the shaft is thus prevented, but the resilient clutch permits the piston rod to further rotate, which is accomplished, of course, by the compression of the spring 21. This further rotation of the piston rod is for the purpose

of bringing the pin 13 into operative engagement with the mechanism for separating the gripper jaws, in a manner to be described hereinafter. When the piston rod rotates in the opposite direction the abutment 15 will strike against the finger 18, and thus the rod 4 and shaft 10 will rotate in unison to move the grippers back to take-out position.

The means for oscillating the piston rod, and the resilient clutch between the rod and the operating shaft, have thus far been described. I shall now describe the means by which the grippers are closed to grasp the article to be transferred, are opened to deposit the transferred article, and are maintained open until they have been oscillated back into position to grasp the next article.

The two jaws, which carry the grippers, are indicated by numeral 24, and these jaws are slidably mounted on squared portions of the shaft, so that they will oscillate with the shaft. The jaws are normally forced toward each other by means of coil springs 25, which are mounted on the shaft and held under compression between the outer face of each jaw and the adjacent shaft bearings. Secured in the shaft, between the jaws, is a pin 26, more clearly shown in Figures 5 and 6, which pin is adapted to release a trigger to permit the jaws to move toward each other to grip the article, in a manner to be described hereinafter.

Each jaw carries a bracket 27 which is adjustably attached thereto by any desired means, as by the elongated slot 28 and screws 29. Adjustably attached to each bracket is a gripper 30; the two grippers cooperating to grasp the article to be transferred when the jaws are brought together. The grippers are preferably made of aluminum, and of course they are made of any desired shape and size. Also any desired means may be employed for adjusting the grippers on the brackets; in the preferred form illustrated herein, the grippers are adjusted longitudinally by means of elongated slots 31 and screws 32. The device is adapted to operate either right-handed or left-handed, and as the piston oscillates through an arc of slightly more than 180°, I have provided the inclined slot 33, for the purpose of having the grippers in horizontal position, when the device is shifted from right-hand operation to left-hand operation.

Arranged slightly below the jaws 24, is a tapered plunger 34, which is adapted to be projected upwardly between the jaws to separate them to release the transferred article. The tapered plunger 34 is slidably mounted in a bearing 35, and normally remains in its lowered position. A lever 36 is pivotally mounted at 37; and one end of this lever extends to a point beneath the tapered plunger, while the other end of the lever extends to a point beneath a vertical slidably mounted pin

38. It will be noted that the lever 36 is unbalanced, so that the end adjacent the tapered plunger is normally down, while the end adjacent the pin 38 is normally up, to maintain the pin 38 in its elevated position. When the grippers have rotated through about 180° from the take-out position to the delivery position, the pin 22 will strike the lug 23, thereby bringing the shaft 10 and the grippers to a stop in substantially a horizontal position. The piston rod 4, however will continue a slightly further rotation, whereby the pin 13 will strike the pin 38 and depress it. This depression of the pin 38 will elevate the opposite end of lever 36, thereby forcing upwardly the tapered plunger 34, between the jaws 24, to separate them and release the transferred article. Just as soon as this separation of the jaws occurs, a trigger snaps between the jaws to maintain them in this open or separated condition until they have been returned to the take-out position to grasp another article. The trigger, which is indicated by numeral 39, is pivotally mounted, and is forced upward by a coil spring 40. After the tapered plunger 34 separates the jaws, the trigger 39 springs between them and maintains them separated, as illustrated in Figure 6. The trigger is provided with an upstanding pin 41, and just as the jaws reach the take-out position this pin 41 is struck by the pin 26 carried by the shaft 10, thereby depressing the trigger 39 from position between the jaws, and thus allowing the springs 25 to force the jaws together, so that the grippers will grasp the article to be transferred.

The complete operation of the device may be briefly described as follows:

Figure 1 shows a portion of a mold table, with a percolator cap in position to be transferred, and with the grippers grasping the article between them. It will be understood, of course, that the device is adapted to the transfer of many types of glass articles, and the percolator cap is shown here merely for purposes of illustration. With the parts in the position illustrated in Figure 1, the usual timing shaft (not shown) will cause the admission of compressed air to pipe 5 and thence to the cylinder 2 beneath the piston 3 adjacent the end thereof. This will cause the piston and its piston rod 4 to travel through substantially 180°. As the shaft 4 starts to rotate in clockwise direction the spring 21 will transmit the pressure from the abutment 16 carried by the rod 4 to the finger 18 carried by the shaft 10, so that the rod and shaft will rotate in unison, carrying the grippers from the transfer position to the point of deposit. When the rod 4 and shaft 10 have turned through substantially 180° to bring the grippers to horizontal position at the point of deposit, the pin 22 will strike the pin 23 and thus bring the shaft 10 to a stop. But by reason of the resilient clutch the pis-

ton rod is permitted to rotate slightly further; and this slight rotation will bring pin 13 into contact with pin 38 thereby depressing it to elevate the opposite end of lever 36 to elevate the tapered plunger 34 to force apart the jaws 24 against the pressure of springs 25. This separation of the jaws releases the article, which is thus deposited on a conveyor, or elsewhere, as desired. The instant the jaws are separated by the tapered plunger, the spring 40 forces the trigger 39 upwardly between the jaws, and thus retains them in open position during their return movement to the take-out position. The usual timing shaft (not shown) will now permit compressed air to enter pipe 6, and thence to cylinder 2 beneath the piston 3 adjacent the end thereof. It will be understood, of course, that when motive fluid is being admitted through pipe 6, the fluid on the opposite side of the piston is being exhausted through pipe 5, the exhaust thereof being regulated by the needle valve 9, as hereinbefore described.

This admission of compressed air through pipe 6 will cause the rod 4 to rotate anticlockwise through substantially 180°. As soon as the rod commences this movement the abutment 15 carried by the rod will strike finger 18 carried by the shaft, and thus the rod and shaft will rotate in unison to carry the grippers back to take-out position; the grippers being retained open by the trigger 39. When this movement starts, the pin 13 will release the pin 38, so that the long end of the lever 36 and the tapered plunger 34 will drop by gravity to their inoperative position, thereby elevating pin 38 into position to be again engaged by pin 13 on the next cycle of operation. Just as the grippers reach the horizontal position, the pin 26, carried by the shaft 10, will strike the pin 41 carried by the trigger 39, depressing it, and thus releasing the jaws, so that the springs 25 may force the grippers together to grasp the next article to be transferred, whereupon the device will repeat the above-described cycle of operation.

All of the above description relates to the preferred form of the device; but the invention is in no manner limited to this specific and preferred form. In fact, the device will operate very satisfactorily without the resilient clutch and with a fixed tapered pin in place of the movable tapered plunger 34 shown herein. In such an arrangement the jaws are mounted directly on the piston rod, and when the rod approaches the end of its rotation to the point of deposit, the jaws will come into contact with a fixed tapered pin which will separate the jaws as they finish the movement. Such a device is slightly more simple in construction than that disclosed herein, and as stated hereinbefore such a device operates very satisfactorily; but by thus opening the jaws while they are completing

their movement to the point of deposit, there is a tendency to throw the article down, rather than to gently deposit it. This tendency is overcome, of course, in this preferred form, by providing the resilient clutch and the movable tapered plunger, so that the jaws are not opened until after they have been brought to rest at the point of deposit.

What I claim is:

- 10 1. A transfer device including an oscillatory shaft, grippers carried by said shaft, means normally tending to force the grippers together, wedging means for separating the grippers adjacent one end of their stroke, a
- 15 member for maintaining the grippers separated during the return stroke, and means to release said member thereby permitting the grippers to move toward each other adjacent the end of the return stroke.
- 20 2. A transfer device including an oscillatory shaft, grippers slidably mounted on said shaft, means normally forcing said grippers toward each other, wedging means for separating the grippers, a trigger adapted to snap
- 25 between the grippers, and means for releasing said trigger.
3. A transfer device including an oscillatory shaft, grippers carried by said shaft, a trigger adapted to snap between the grippers
- 30 to maintain them open, and means for dislodging the trigger to permit the grippers to close.
4. A transfer device including an oscillatory rod, a shaft, a resilient clutch between
- 35 the rod and shaft, grippers carried by the shaft, means to rotate said shaft to move the grippers to delivery position, and means operated by further rotation of said rod to effect operation of said grippers.
- 40 5. A transfer device including an oscillatory piston and piston rod, a shaft, a resilient clutch between the piston rod and shaft to permit the rod to rotate further than the shaft, grippers operated by said shaft, and
- 45 means operated by the further rotation of the piston rod for separating the grippers.
6. A transfer device including an oscillatory piston and piston rod, a shaft, a resilient clutch between the piston rod and shaft to
- 50 permit the rod to rotate further than the shaft, grippers slidably mounted on the shaft, springs normally forcing the grippers toward each other, means operated by the further rotation of the piston rod for separating the
- 55 grippers, a trigger adapted to snap between the grippers to maintain them separated, and means carried by the shaft for dislodging the trigger.
7. A transfer device including an oscillatory piston and piston rod, a shaft, a resilient
- 60 clutch between the piston rod and shaft to permit the rod to rotate further than the shaft, grippers slidably mounted on the shaft, springs normally forcing the grippers toward
- 65 each other, a tapered plunger for separating

the grippers, said plunger being operated by the said further rotation of the rod, a trigger adapted to snap between the grippers after they have been separated, and means actuated by the rotation of the shaft for dislodging the trigger to permit the grippers to grasp an article.

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