

Dec. 29, 1925.

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LEER FEEDING APPARATUS

Filed Nov. 17, 1923

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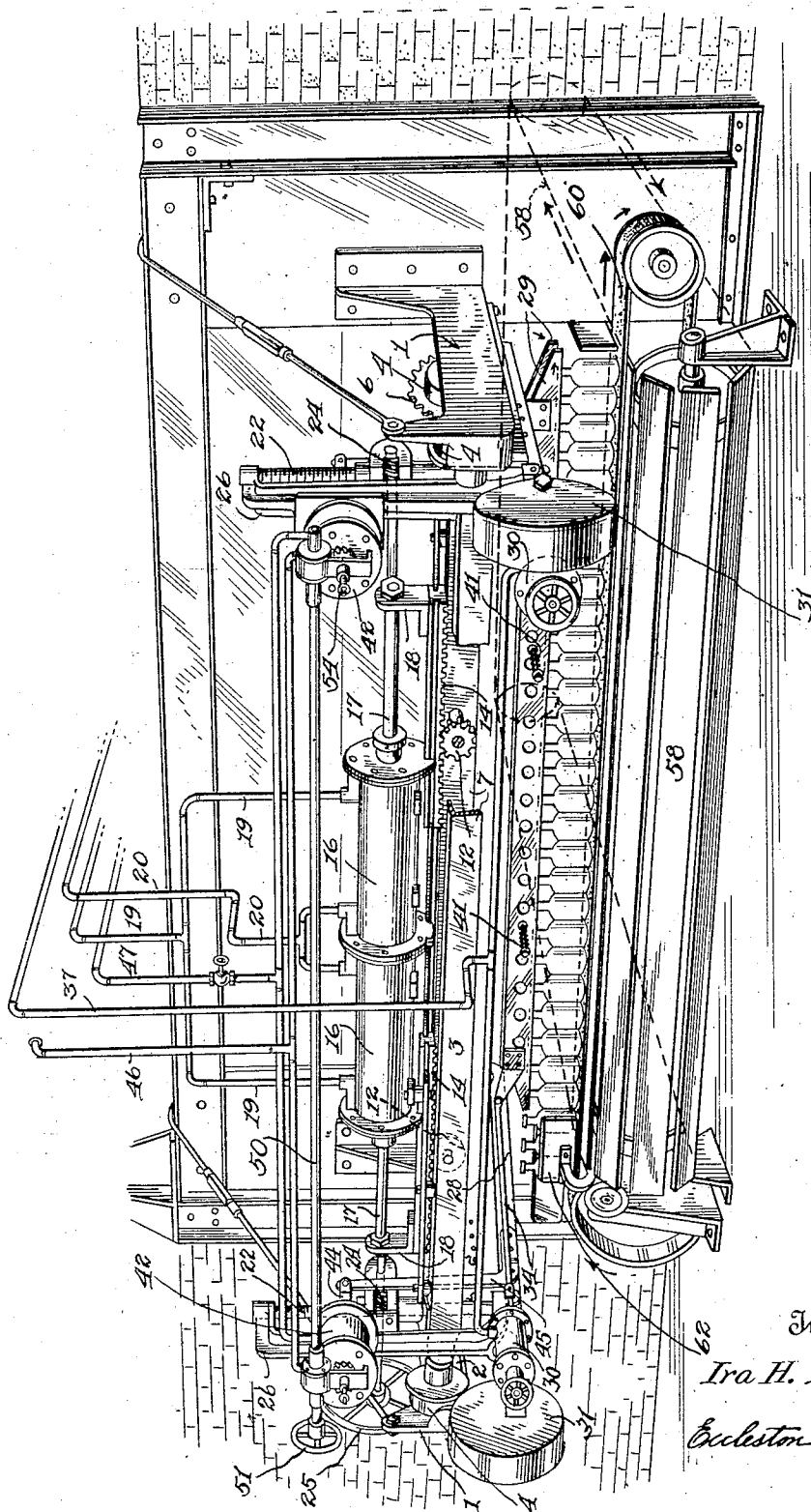


Fig. 1.

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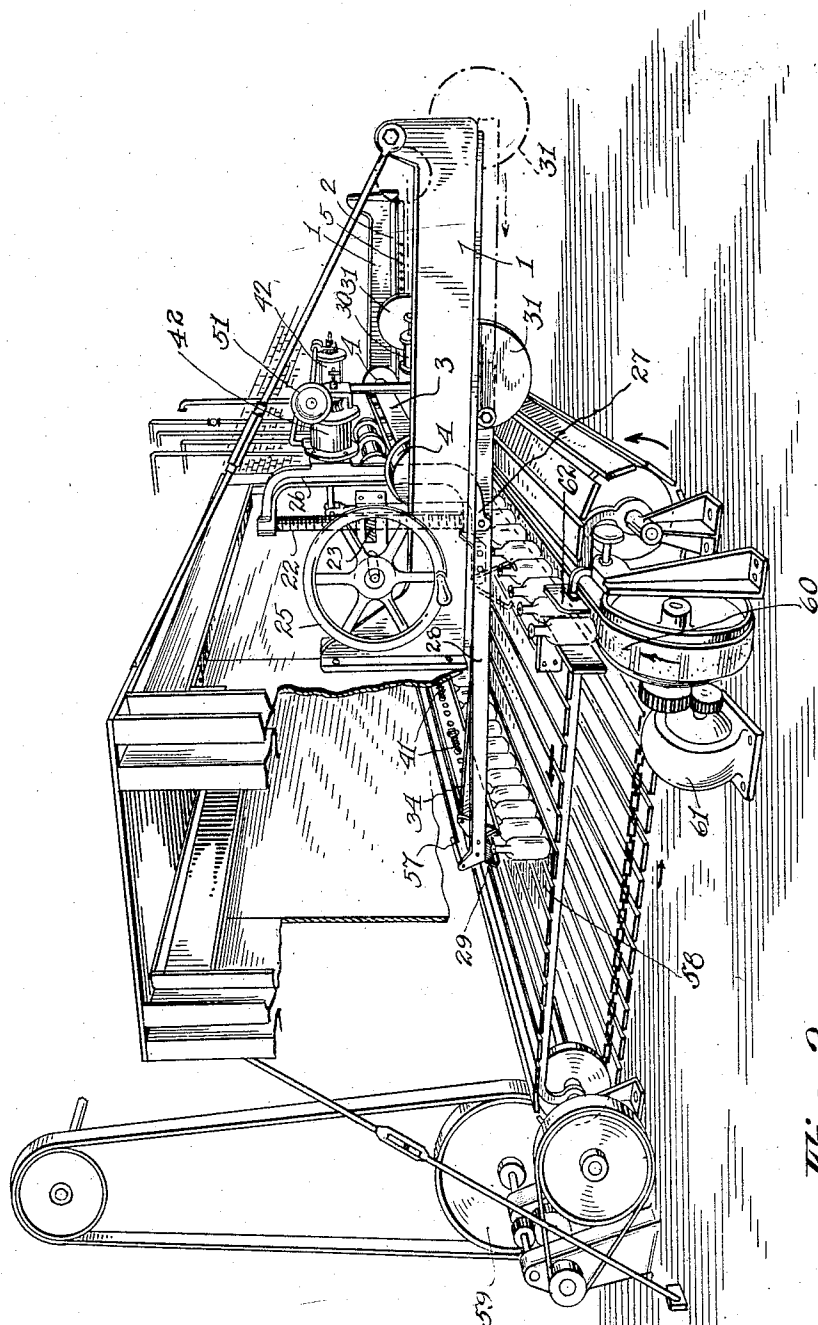


Fig. 2.

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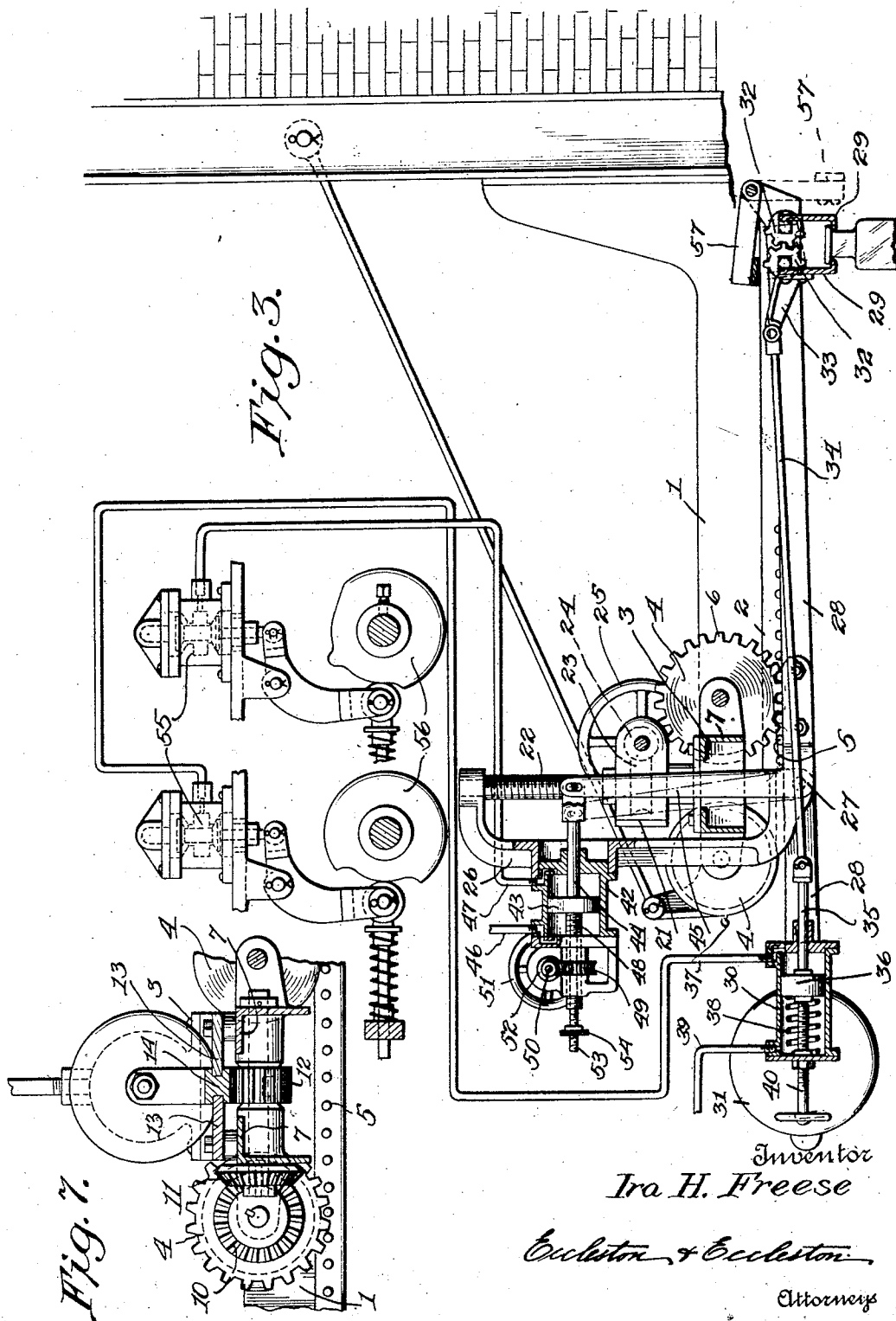
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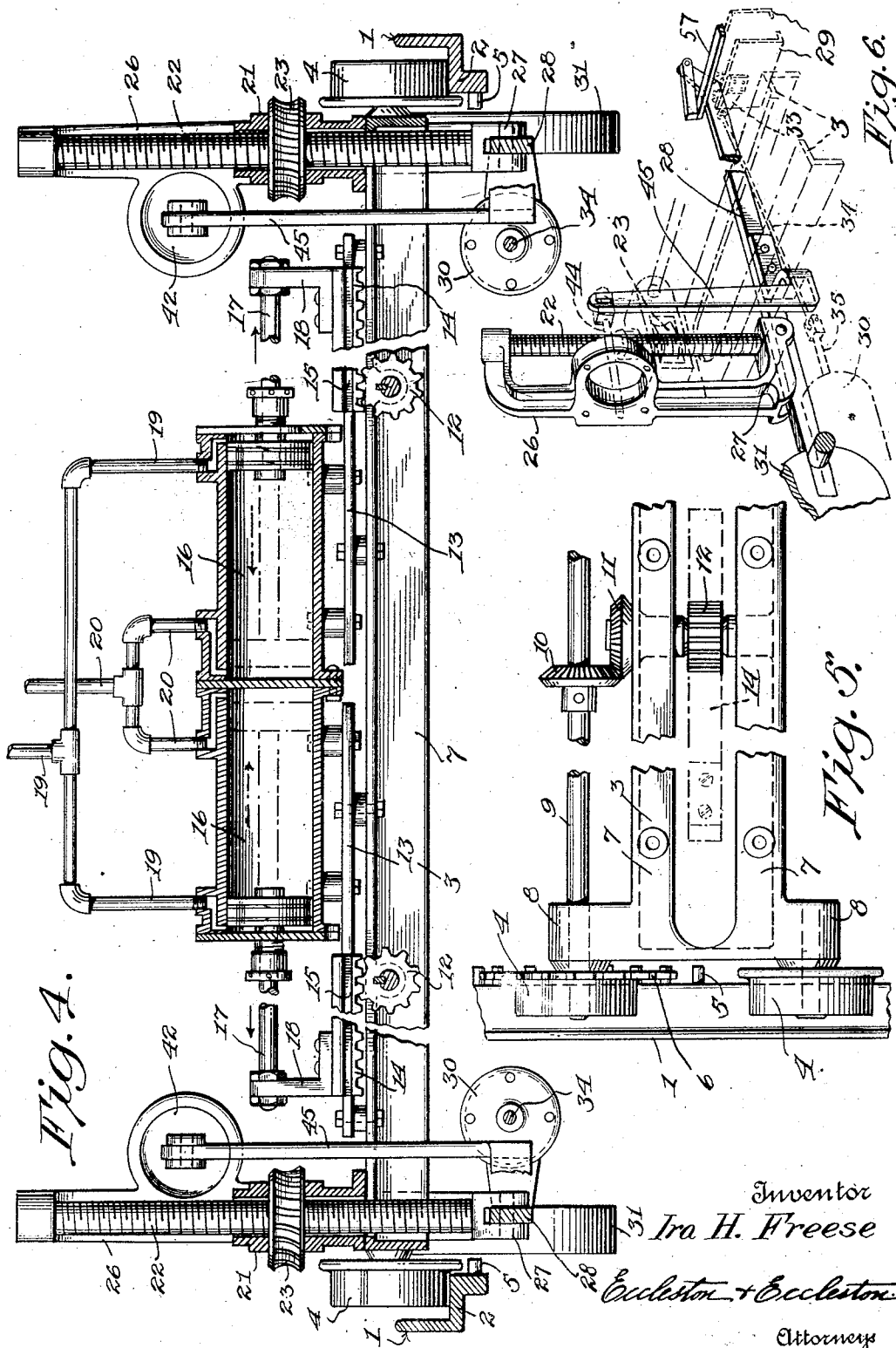
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UNITED STATES PATENT OFFICE.

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LEER-FEEDING APPARATUS.

Application filed November 17, 1923. Serial No. 675,273.

To all whom it may concern:

Be it known that I, IRA H. FREESE, a citizen of the United States, and a resident of Clarksburg, in the county of Harrison and State of West Virginia, have invented certain new and useful Improvements in Leer-Feeding Apparatus, of which the following is a full, clear, and exact description.

The purpose of the invention described herein is to provide an improved apparatus for mechanically feeding the ware to a leer, or annealing oven, as it comes from the blowing or pressing machines. The invention relates particularly to the feeding of bottles, though it is not thus limited.

The common practice in feeding bottles or other ware of large diameter to a leer, is to provide a pusher, which is designed to push the ware into the leer, row by row. This is satisfactory for ware of large diameter, but for slender ware, either tall or short, it is apparent that the articles will be very easily toppled over by the pusher. One of the purposes of the present invention is, therefore, to provide a mechanism that will lift the bottles, carry them into the leer, and then deposit them on the leer pans, thereby avoiding any tendency to overturn them.

Another object of the invention is to provide a mechanism of this character which is adapted to pick up a variable number of articles; the number picked up depending solely on the number of articles on the transverse conveyor, whether it be one article, or a whole row of them.

A further object of the invention is to provide an apparatus that may be quickly and easily changed into a feeder of the pusher type, when so desired.

Another object of the invention resides in the provision of an apparatus of this character which is easily adjustable to suit bottles of various heights, and also bottles having necks of various diameters.

Another object of the invention is to arrange the feeding apparatus with respect to the leer in such a manner that the floor space and approach to the leer will be unobstructed.

Various other objects and advantages of the invention will be apparent to those skilled in the art, from the following de-

tailed description when taken in connection with the accompanying drawings; in which, 55

Figure 1 is a perspective view of the complete apparatus; the parts being shown in a position about to lift a row of bottles from the transverse conveyor.

Figure 2 is a perspective view of the complete apparatus; the parts being shown in a position after having deposited a row of bottles in the leer. 60

Figure 3 is a side elevation of the carriage and the operating mechanism for the lifting arms carried thereby; parts being in section to more clearly disclose the invention. 65

Figure 4 is a vertical transverse sectional view of the carriage and parts carried thereby. 70

Figure 5 is a detail plan view of a portion of the carriage operating mechanism.

Figure 6 is a fragmentary perspective view of certain adjusting means and operating means for the lifting arms; and 75

Figure 7 is a vertical sectional view through the carriage.

Referring to the drawings more in detail, numerals 1, 1, refer to two brackets mounted on the furnace front and extending outwardly therefrom in spaced parallel relation; and these brackets have tracks 2, 2, formed integrally therewith. A carriage, indicated generally by numeral 3, is provided with wheels 4 mounted on the tracks 2, 2, whereby the carriage may be moved toward and from the annealing furnace, or leer. To provide a positive engagement between the wheels and tracks, the brackets are provided with inwardly projecting pins 5 which are adapted to be engaged by teeth 6 formed on the flange of one of the wheels on each side of the carriage. Obviously it is not necessary to employ this particular means for securing a positive engagement 85 between the wheels and tracks, and in some instances it may be desirable to omit the positive connection entirely, and depend on the frictional engagement of the wheels with the tracks. 100

The carriage 3, and the means for moving it toward and from the leer, will now be described.

The particular construction of the carriage body or frame, is, of course, merely a matter of design, and may be changed as desired; 105

out as illustrated herein, it consists of two parallel spaced angle irons 7, 7, which are integrally connected at their ends, as shown in Figure 5, and are provided with journal bearings 8 for the axles of the carriage wheels 4. The axle for the driving wheels, as indicated by numeral 9, extends entirely across the carriage and is connected to both of the driving wheels. Fixedly mounted on the axle 9, adjacent each end thereof, is a bevel gear 10, and these bevel gears mesh with bevel gears 11 mounted on stub shafts journaled in the angle irons 7, 7. Also fixed to each of the stub shafts is a pinion 12 arranged in the space between the angle irons and adapted to be engaged and driven by rack bars, in a manner now to be described.

Referring particularly to Figures 4 and 7, spaced parallel guide rails 13, 13, are mounted on the angle irons 7, and two rack bars 14, 14, are slidably mounted between these guide rails; the rack bars being provided with grooves 15 for the purpose of slidably receiving the guide rails.

Two fluid pressure cylinders 16, 16, are mounted on the guide rails and spaced therefrom, and the piston rods 17, 17, of these cylinders are connected to brackets 18, 18, fixed to the rack bars 14, 14. Fluid under pressure is admitted alternately to the remote and adjacent ends of the two cylinders through the pipes 19 and 20 respectively; and the admission and exhaust of fluid to these pipes is controlled by any type of valve commonly employed in fluid operated machines, such valves being usually operated by motor driven cams.

The operation of the carriage driving mechanism will be apparent from the foregoing description. Assuming the parts to be in the position as shown in Figure 4, then when fluid under pressure is admitted to the remote ends of the cylinders 16, 16, the two pistons and rods will be caused to approach each other. As the piston rods move inwardly the two rack bars 14, 14, will also be moved inwardly, thereby rotating the pinions 12, 12, and the bevel gears 11, 11, carried on the same shaft. The bevel gears 11, 11, mesh with the bevel gears 10, 10, fixed to the driving shaft 9, which carries the two driving wheels 4, 4, having the teeth 6 which engage with the fingers 5. It is thus seen that as the pistons are moved inwardly the carriage is caused to travel on the tracks 2, 2, toward the furnace front; and that when pressure is admitted to the adjacent ends of the cylinder the various parts will be moved in the opposite direction thereby moving the carriage away from the furnace front.

The construction of the carriage and the means for moving it back and forth on the tracks will be understood from the foregoing

description; and the mechanism carried by the carriage will now be described.

Mounted on each end of the carriage is a housing, indicated by numeral 21, and passing through each of the housings is a vertical shaft 22. The shaft is screw-threaded, and has mounted thereon a worm gear 23 which is engaged by the worm 24 adapted to be rotated by an ordinary handwheel 25. As clearly shown in the drawings, the worm gear is mounted in the housing so that it cannot move longitudinally of the shaft. By the rotation of the handwheel the worm gear 23 will be rotated, and as it is screw-threaded on the shaft it will be obvious that the shaft will be raised or lowered, depending on the direction of rotation of the handwheel.

A bracket 26 is fixed to the shaft 22, and the lower end of this bracket is bifurcated as indicated by numeral 27, and clearly shown in Figure 6. An arm 28 is pivotally mounted, intermediate its ends, in the bifurcated head 27, and pivotally attached to the forward end of each of these arms is a pair of clamps or jaws 29, 29. Mounted on the the opposite end of these arms is a cylinder 30 for operating the clamps or jaws; and a counterweight 31 is also mounted on the ends of the arms adjacent the cylinder. As shown in Figure 3, the clamps or jaws 29, 29, are pivotally mounted on the ends of the arms 28, and are provided with intermeshing gears 32, 32, whereby the clamps are moved in unison. A bracket 33 is fixed to one of the clamps, and pivotally attached to the bracket is a link 34; the other end of the link being pivotally attached to the piston rod 35 of piston 36 mounted in cylinder 30.

The clamps are closed by admitting fluid pressure to the front of the cylinder 30 through the pipe 37, and it is preferred to open the jaws by means of a coil spring 38; but obviously fluid pressure may also be employed for opening the jaws, and for that purpose a pipe 39 leading to the rear end of the cylinder, is illustrated in Figure 3. It is desirable that some means be employed to prevent any squeezing of the bottle necks when the jaws are closed, and for this purpose an adjusting screw 40 is mounted in the rear end of the cylinder, and the rearward movement of the piston 36 will be limited by abutting against the inner end of the adjusting screw. A lock-nut is employed to maintain the screw in adjusted position. By reference to Figure 1 it will be seen that light coil springs 41 are employed on the clamping jaws 29, 29, for the purpose of maintaining a slight closing pressure thereon.

Suitably mounted in the bracket 26 is an elevating cylinder 42, the piston 43 of which

has its piston rod 44 pivotally connected to a lever 45 which is fixed at its lower end to the arm 28. Obviously the reciprocation of the pistons 43 will raise and lower the arms 28 and the clamping jaws 29, 29, carried thereby. Fluid pressure pipes 46, 47, are connected to the cylinder 42, for admitting pressure to the cylinder for operating the piston. If preferred, a coil spring such as illustrated in cylinder 30, could be employed in cylinder 42 for moving the piston in one direction.

For the purpose of limiting the rearward stroke of the pistons 43, or the upward movement of the arms 28, a hollow adjusting screw 48 is mounted in the rear end of each of the cylinders 42, and a worm gear 49, having its bore threaded, is mounted on the hollow screw. A rod 50, provided with an operating wheel 51, extends entirely across the device and has worms 52, 52, mounted thereon to engage with the worm wheels 49. It will be apparent that the rotation of the handwheel 51 will cause the rotation of both of the worm gears 49, thereby moving the hollow adjusting screws inwardly or outwardly, depending on the direction of rotation of the handwheel, and the rearward limit of the pistons 43, and hence the upward limit of the arms 28, will be accordingly varied.

As previously stated, the adjusting screw 48 is hollow, and the piston 43 carries an extension rod 53 which passes entirely through the hollow adjusting screw and has a nut 54 threaded thereon adjacent its rear end. As the piston reciprocates the nut 54 will strike the screw member 48 and thereby limit the forward movement of the piston, and consequently limit the downward movement of the arms 28.

The means for controlling the supply of fluid pressure, such as air, to the various cylinders in timed relation, forms no part of the present invention, and any preferred form of valves and cams for operating the same may be employed; conventional forms of valves and cams being illustrated in Figure 3, and indicated by numerals 55 and 56 respectively.

If the ware to be handled is of rather large diameter, it may be pushed onto the leer pans instead of being picked up and deposited thereon; and the means by which the apparatus may be quickly converted into a feeder of the pusher type will now be described.

Pivotally mounted on the arms 28 at their inner ends, and inward of the clamping jaws 29, 29, is a pusher element 57. This pusher is of considerable weight, so that when it is in its operative position, as shown in dotted lines, in Figure 3, the force of gravity will be sufficient to hold it in a substantially vertical plane when it is forced

against the articles in the act of pushing them into the leer. When the pusher bar 57 is employed the fluid pressure supply to the cylinder 30 will be shut off, for there will be no necessity for operating the clamping jaws 29, 29; but the operation of the other parts of the apparatus will remain the same. When ware of relatively small diameter is again to be handled, the pusher bar will be swung back to its inoperative position, as shown in full lines in Figure 3, fluid pressure will be admitted to the cylinder 30, and the apparatus is ready again to operate to pick up the ware and deposit it in the leer on the leer pans.

The present invention relates particularly to the apparatus for feeding the ware into the leer, and it is of general application to all types of leers; therefore, the particular construction of the leer conveyer, the leer pans, and the means for carrying the ware to the leer, need not be of any specific form, but may be of any conventional construction. The construction shown herein, particularly in Figures 1 and 2, is merely illustrative and is not to be considered in any limiting sense. An endless conveyer, indicated by numeral 58, travels from the front to the rear of the leer and is driven continuously by any preferred source of power; the driving means being indicated generally by the numeral 59. The endless conveyer 58 is formed of a series of leer pans of any desired construction, which are adapted to receive the articles to be annealed and carry them slowly through the furnace. Extending transversely of the furnace, and in front thereof, is an endless belt 60 driven by an independent motor 61. This belt may be formed of pivotally connected metal sections if preferred, and its purpose is to carry the ware, that has been brought from the pressing or blowing machine, across the face of the leer to be picked up by the feeder and deposited in the leer. A member for guiding the articles on the endless belt is indicated by numeral 62. The operation of the complete apparatus will now be described.

Referring particularly to Figure 1, the bottles are fed continuously across the front of the leer on the endless belt 60, the necks of the bottles passing between the open clamping jaws 29, 29. At the proper moment fluid pressure is admitted to the forward ends of the cylinders 30; the admission of the fluid pressure to these and the other cylinders being controlled in timed relation by the usual valves and cams 55, 56. When the pressure is admitted to the forward ends of the cylinders 30, the pistons 36 are forced rearwardly, and the link connections 34 between the piston rods 35 and the brackets 33 cause the jaws 29, 29, to be moved to closed or clamping position to grip the articles by their necks as shown in Figure 3.

The adjusting screw 40 determines the extent of closing of the jaws, and this avoids any squeezing of the necks; and in handling ware having a beading around the neck the clamping jaws merely catch under the beading without exerting any lateral pressure. It is to be noted here that it is entirely immaterial to the proper operation of this machine, whether one bottle or a continuous row of bottles is positioned on the endless belt at the time the jaws operate to grip them, for the device operates in exactly the same manner whether one or one hundred bottles are on the endless belt at the time the grippers function.

After the bottles have been grasped by the jaws 29, 29, fluid pressure is admitted to the forward end of the cylinders 42, and as the pistons 43 and rods 44 move rearwardly the levers 45 are swung to the rear, thereby elevating the arms and lifting the bottles clear of the endless belt 60.

Fluid pressure is now admitted to the outer ends of cylinders 16, and as the pistons move inwardly, the racks 14 operated thereby rotate the pinions 12, and through the bevel gears 11, 10, and shaft 9, the driving wheels of the carriage are rotated to move the carriage and all parts carried thereby, bodily toward the leer front. As the carriage moves toward the leer front, the grippers carrying the ware are moved well into the heating zone of the leer, as shown in Figure 2. After the carriage, and consequently the grippers, has reached its innermost position, fluid pressure is admitted to the rear end of the cylinder 42, and at the same time the pressure is released from the forward portion of the cylinder, and the piston 43 is operated to swing the lever 45 forwardly, thereby lowering the arms 28, and depositing the articles on the leer pans. Just after the bottles have been deposited on the leer pan and have been stabilized thereon, the pressure is released from the forward portion of the cylinder 30, and the spring 38 moves the piston 36 forwardly to open the clamping jaws 29, 29, thereby leaving the row of deposited ware free to be carried slowly through the leer. The position of the parts just after releasing the deposited ware, is clearly shown in Figure 2.

Fluid pressure is now admitted to the forward ends of cylinders 42, to elevate the arms 28 and grippers 29, 29; the grippers remaining in open position. After the arms have been elevated, pressure is admitted to the inner ends of cylinders 16 thereby moving the pistons outwardly and causing the carriage to be moved away from the leer front and causing the open elevated grippers to be again brought over the endless belt ready to again grip a row of ware, and thereby completing a cycle of operations.

It will be apparent from the foregoing

description that the apparatus will operate in a highly efficient manner in the handling of ware of relatively small diameter; and that the proper operation of the apparatus is entirely independent of the number of articles on the endless belt at the time the grippers function.

By the adjustment of the screws 40 the rearward limit of movement of the pistons 36 is varied, thus varying the extent to which the jaws 29, 29, are closed, to suit bottle necks of different sizes, and to prevent squeezing of the bottle necks. It is also to be noted here that in place of the spring 38 for moving the piston in one direction, fluid pressure operation may be substituted if preferred.

By the operation of the handwheel 25, the arms 28 and grippers 29, 29, are raised or lowered bodily as may be necessary to handle ware of different height.

By the operation of the handwheel 51 and nuts 54, both the outward and inward limit of the stroke of pistons 43 may be varied, thus varying the upper and lower limit of the arms 28 and grippers 29, 29, carried thereby.

The foregoing description relates to the operation of the device as a pick-up feeder of slender ware; but if ware of relatively large diameter is to be handled, the pick-up feature may be omitted, and the apparatus may be quickly changed into a feeder of the pusher type.

When the apparatus is to be employed as a pusher it is only necessary to swing the pusher bar 57 from its inoperative position to its operative position, as shown in Figure 3 in dotted lines; and as the grippers will not be employed the fluid pressure supply to cylinder 30 will be shut off.

In the operation of the apparatus as a feeder of the pusher type, the pusher bar 57 is lowered behind a row of ware, and as the carriage is moved toward the leer front the pusher bar will push the row of articles into the heating zone of the leer; and the bar will then be lifted and carried back to feed in the next row of ware.

Obviously the invention described herein may be modified in a great many ways by those skilled in the art, and no attempt has been made to describe any such modifications; it being understood that all modifications are sought to be included in the scope of the appended claims.

I claim:

1. A leer feeder including means for lifting a row of glass ware, said means being operative irrespective of the number of articles or their lineal position in the row, and means for depositing the glass ware in the leer.

2. A leer feeder including continuous gripping means for lifting a variable num-

ber of glass articles, and means for depositing the articles in a leer.

3. A leer feeder including means for feeding a row of glass articles across the front of a leer, and continuous gripping means for lifting said articles and depositing them in a leer, the operation of said lifting means being independent of the number of articles or their lineal position in the row.

4. A leer feeder including continuous gripping means for lifting a variable number of glass articles, means for moving the articles into a leer, and means for lowering the articles onto the leer pans.

5. A leer feeder including continuous gripping means for lifting a variable number of articles and moving them into a leer, and means for varying the extent to which the articles are lifted.

6. A leer feeder including continuous gripping means for lifting a row of articles irrespective of the number of articles or their position in the row, moving them into a leer, and lowering them onto the leer pans, and means for varying the extent to which the articles are lowered.

7. A leer feeder including continuous gripping means for gripping a variable number of articles and moving them into a leer, the position of the gripping means being variable as to elevation to suit articles of different height.

8. A leer feeder including continuous gripping means for gripping a variable number of articles and moving them into a leer, the extent of closing of said gripping means being variable to suit articles of different size.

9. A leer feeder including a carriage movable bodily toward and from a leer, arms carried by said carriage, and a pair of clamping jaws extending transversely of the leer and carried by said arms, said gripping jaws placing rows of glass ware in the leer transversely thereof.

10. A leer feeder including a carriage movable bodily toward and from a leer, pivoted arms carried by said carriage, means for raising and lowering said arms, and gripping means carried by the arms and extending transversely of the leer, said clamping means placing rows of glass ware in the leer transversely thereof.

11. A leer feeder including a carriage movable bodily toward and from a leer, pivoted arms carried by said carriage, means for raising and lowering said arms, and a pair of clamping jaws extending transversely of the leer and carried by said arms, said gripping jaws placing rows of glass ware in the leer transversely thereof.

12. A leer feeder including a carriage movable bodily toward and from a leer, pivoted arms carried by the carriage, a pair of gripping jaws extending transversely of

the leer and carried by the arms, and means carried by the arms for opening and closing the gripping jaws, said clamping jaws placing rows of glass ware in the leer transversely thereof.

13. A leer feeder including a carriage movable bodily toward and from a leer, arms pivotally mounted on the carriage, gripping jaws extending transversely of the leer and carried by the arms, means for opening and closing the jaws, means for raising and lowering the arms, and means for moving the carriage, said clamping jaws placing rows of glass ware in the leer transversely thereof.

14. A leer feeder including a carriage movable bodily toward and from a leer, arms pivotally mounted on the carriage, gripping jaws extending transversely of the leer and carried by the arms, and a fluid pressure cylinder carried by the arms and operatively connected with the gripping jaws, said clamping jaws placing rows of glass ware in the leer transversely thereof.

15. A leer feeder including a carriage movable bodily toward and from a leer, arms pivotally mounted on the carriage, gripping jaws carried by the arms, a fluid pressure cylinder operatively connected with the gripping jaws, and means for varying the limit of stroke of the piston in said cylinder to vary the extent of closing of the gripping jaws.

16. A leer feeder including a carriage movable bodily toward and from a leer, arms pivotally mounted on the carriage, gripping jaws carried by the arms and extending transversely of the leer, and means for raising and lowering the arms bodily to suit ware of different height, said clamping jaws placing rows of glass ware in the leer transversely thereof.

17. A leer feeder including a carriage movable bodily toward and from a leer, arms pivotally mounted on the carriage, gripping jaws carried by the arms and extending transversely of the leer, means for swinging the arms upwardly and downwardly about their pivots, and means for raising and lowering the arms bodily to suit ware of different height, said clamping jaws placing rows of glass ware in the leer transversely thereof.

18. A leer feeder including a carriage movable bodily toward and from a leer, arms pivotally mounted on the carriage, gripping jaws carried by the arms and extending transversely of the leer, and a fluid pressure cylinder operatively connected with said arms for swinging them upwardly and downwardly about their pivots, said clamping jaws placing rows of glass ware in the leer transversely thereof.

19. A leer feeder including a carriage movable bodily toward and from a leer, arms

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- pivotally mounted on the carriage, gripping jaws carried by the arms, a fluid-pressure operated cylinder and piston operatively connected with said arms for swinging them upwardly and downwardly about their pivots, and means for varying the limit of stroke of the piston in one direction to vary the downward swinging limit of the arms.
20. A leer feeder including a carriage movable bodily toward and from a leer, arms pivotally mounted on the carriage, gripping jaws carried by the arms, a fluid pressure operated cylinder and piston operatively connected with said arms for swinging them upwardly and downwardly about their pivots, and means for varying the limit of stroke of the piston in one direction to vary the upward swinging limit of the arms.
21. A leer feeder including a carriage movable bodily toward and from a leer, arms pivotally mounted on the carriage, gripping jaws carried by the arms, a fluid-pressure operated cylinder and piston operatively connected with said arms for swinging them upwardly and downwardly about their pivots, and means for varying both limits of stroke of the piston to vary the upward and downward swinging limit of the arms.
22. A leer feeder including a carriage movable bodily toward and from a leer, threaded shafts mounted on the carriage, arms pivotally attached to the lower ends of the shafts and extending forwardly in substantially a horizontal plane, gripping jaws carried by the arms, and means for adjusting the shafts vertically.
23. A leer feeder including a carriage movable bodily toward and from the leer, two shafts mounted in said carriage, an arm pivoted to the lower end of each shaft, gripping jaws carried by the arms, a cylinder mounted on each of the arms and operatively connected with the gripping jaws, a lever fixed to each of the arms, and a cylinder operatively connected with each of the levers.
24. A leer feeder including a carriage movable bodily toward and from the leer, two shafts mounted for vertical adjustment in said carriage, an arm pivoted to the lower end of each shaft, means for adjusting the shafts vertically, gripping jaws carried by the arms, a cylinder and piston mounted on each of the arms and operatively connected with the gripping jaws, means for varying the limit of stroke of the piston, a lever fixed to each of the arms, a cylinder and piston operatively connected with each of the levers, and means for varying the limit of stroke of the second-mentioned piston.
25. A leer feeder including a carriage movable bodily toward and from the leer, arms carried by the carriage, means carried by the arms for picking up glassware, and means carried by the arms for pushing glassware.
26. A leer feeder including a carriage movable bodily toward and from the leer, arms carried by the carriage, means carried by the arms for picking up glassware, means carried by the arms for pushing glassware, and means for rendering either of said means inoperative.
27. A leer feeder including a carriage movable toward and from the leer, arms carried by the carriage, gripping jaws carried by the arms, and a pusher member pivotally attached to the arms whereby it may be swung to inoperative position.
28. A leer feeder including a carriage, means carried by the carriage for moving glassware into a leer, and means for moving the carriage toward and from the leer, said last-mentioned means including two oppositely movable pistons, and operative connections between the pistons and the driving wheels of the carriage.
29. A leer feeder including a carriage, means carried by the carriage for moving glassware into a leer, and means for moving said carriage toward and from the leer, said last-mentioned means including two oppositely movable pistons, rack bars operated by the pistons, pinions engaged by the rack bars, and operative connections between the pinions and the driving wheels of the carriage.
30. A leer feeder including a track, pins or the like adjacent the track, a carriage mounted on the track, a toothed flange on one set of the carriage wheels and adapted to engage the pins, two oppositely movable pistons mounted on the carriage, rack bars operated by the pistons, pinions engaged by the rack bars, operative connections between the pinions and the toothed wheels, and means mounted on the carriage for moving glassware into the leer.
31. A leer feeder, including a pair of clamping jaws extending transversely of the leer for substantially the entire width thereof, means for opening or closing said jaws, and means for moving the jaws into the leer.
32. A leer feeder, including a pair of clamping jaws extending transversely of the furnace and adapted to clamp a row of glass ware irrespective of the number of articles or their arrangement in the row, and means for moving the jaws into the leer, said clamping jaws placing rows of glass ware in the leer transversely thereof.

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