March 1, 1960 F. Z. FOUSE 2,926,801

CONTAINER HANDLING MECHANISM

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Fig. 4

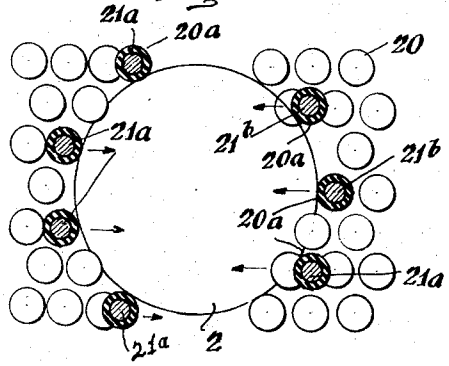


Fig. 5

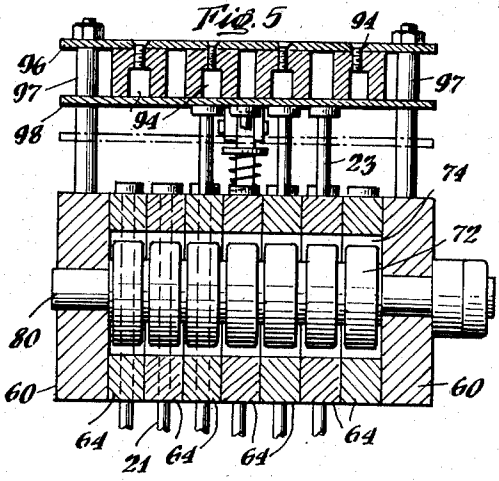
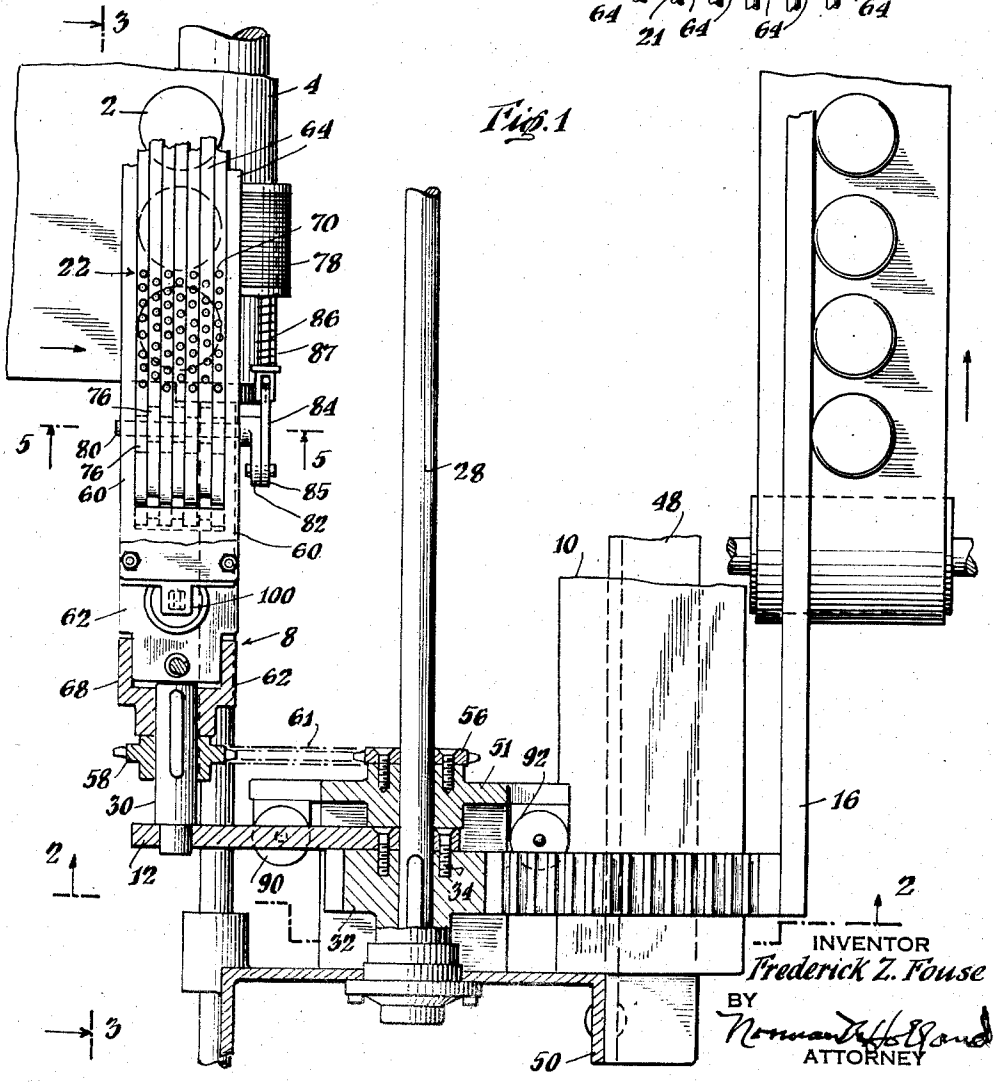


Fig. 1



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CONTAINER HANDLING MECHANISM

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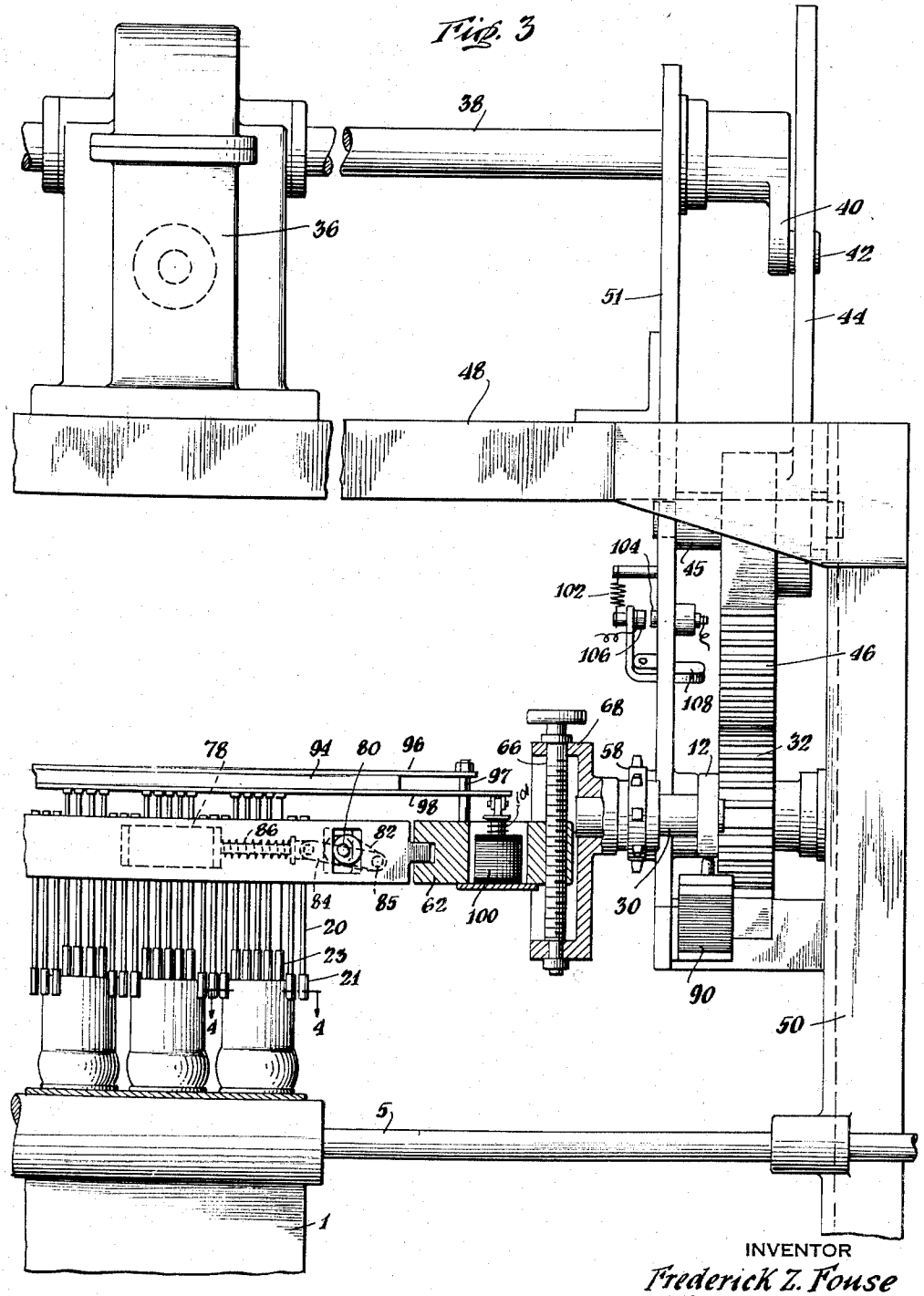
Fig. 3



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CONTAINER HANDLING MECHANISM

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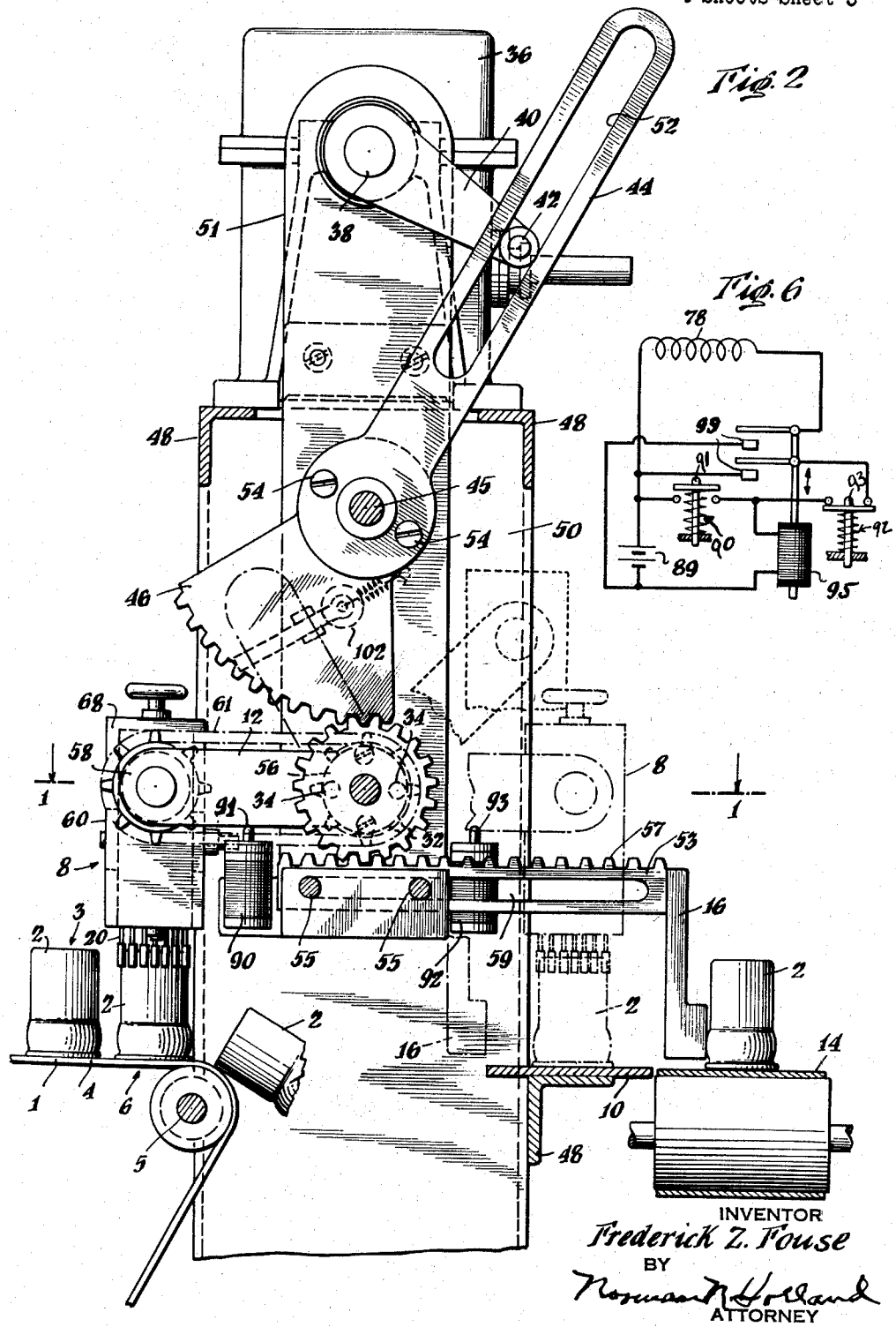

Fig. 2

Fig. 6

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CONTAINER HANDLING MECHANISM

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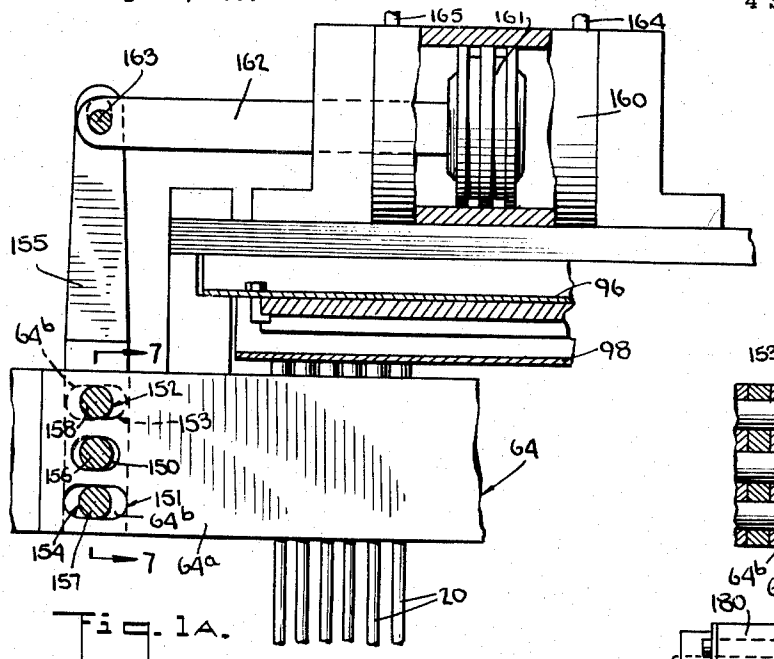

Fig. 1A.

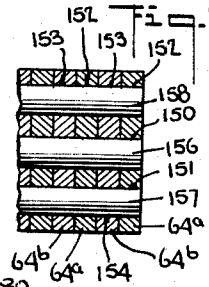

Fig. 7.

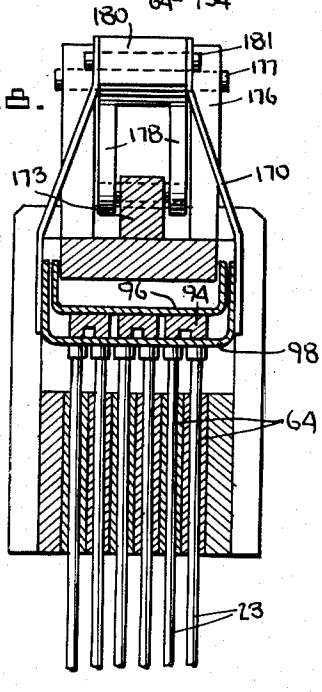

Fig. 8.

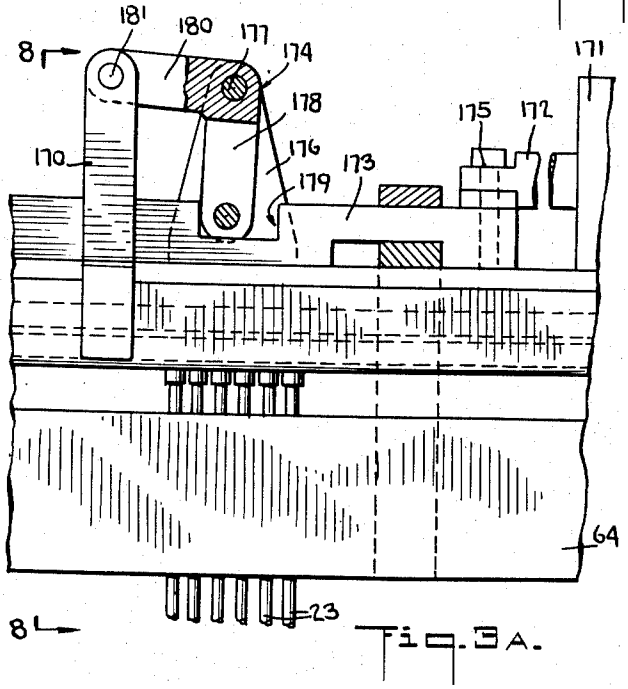

Fig. 3A.

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2,926,801

CONTAINER HANDLING MECHANISM

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Application August 14, 1956, Serial No. 604,013

16 Claims. (Cl. 214—147)

This invention relates to container handling mechanism for transferring glassware from one position to another and more particularly, to an unloader for lifting a row of containers from a container-receiving station, such as a lehr, and depositing them on a conveyor.

In the prior practice, lehr unloaders have been provided with unscramblers to select containers from a mass and present the containers one-by-one to a conveyor. The containers in such unscramblers jostled against each other which occasioned breaks and checks. Moreover, in such devices, it was necessary for the unloader to operate faster than the lehr in order to keep the lehr clear, which is undesirable.

Some types of unloaders are not capable of rejecting broken ware. Other types of unloaders are provided with clamping fingers to grasp the containers. However, these require precision in manufacture and maintenance and are thus expensive and impracticable.

One object of the present invention is to provide a lehr unloader which will unload a plurality of containers simultaneously.

Another object of the present invention is to provide an unloader which will automatically reject broken ware.

Another object of the present invention is to provide an unloader which will unload at approximately the same speed that the lehr delivers containers to give a smooth operation.

A further object of the present invention is to provide a lehr unloader which will permit the containers to move past inspectors at a convenient speed to permit more efficient inspection of the containers.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

A preferred embodiment of the invention has been chosen for purposes of illustration and description and is shown in the accompanying drawings, forming a part of the specification, wherein:

Fig. 1 is a plan view partly in section of the unloader of the present invention taken along line 1—1 of Fig. 2;

Fig. 1*a* is a fragmentary elevational view, partly in section, showing an alternate form of the container grasping mechanism;

Fig. 2 is an end view of the unloader, partly in section, taken along line 2—2 of Fig. 1, showing the improved transfer mechanisms;

Fig. 3 is a side view of the unloader, partly in section, taken along line 3—3 of Fig. 1, showing the improved ware-gripping mechanism;

Fig. 3*a* is a fragmentary elevational view, showing an alternate form of the pin releasing mechanism;

Fig. 4 is a sectional top view of the ware-gripping means taken along line 4—4 of Fig. 3, showing a container being gripped thereby;

Fig. 5 is a sectional end view of the lifting device taken along line 5—5 of Fig. 1, showing a set of cams for actuating ware-gripping mechanism;

Fig. 6 is a diagrammatic view of an electric circuit which may be used with the invention for actuating the cams shown in Fig. 5;

Fig. 7 is a sectional view taken along line 7—7 of Fig. 1*a*; and

Fig. 8 is a sectional view taken along line 8—8 of Fig. 3*a*.

The unloader will first be described generally and the details will be described under appropriate headings.

General description

A row of containers 2 are brought by the lehr conveyor 4 to an unloading position or station 6 at the end of the conveyor 4. The conveyor 4 is continuously moved by the rotating shaft 5 slowly to present a row of containers 2 to the station 6. The conveyor is moved at such a slow speed that its movement is almost imperceptible.

The containers 2 are inverted on the conveyor 4 so that the mouth 1 of each container 2 lies on the conveyor 4 and the closed bottom 3 is uppermost. When the row of containers 2 are at the unloading station 6, a lifting assembly 8 is lowered on to the row of containers 2 to grip the containers, lift them from the conveyor 4, and deposit them on a stationary or dead plate 10. The lifting and transfer of the assembly 8 is accomplished by an arm 12, to which the gripping assembly 8 is mounted, through an angle of 180° from the position shown in full lines in Fig. 2 to the position shown in broken lines in Fig. 2. The containers 2 are then moved by a pusher 16 on to a conveyor 14 which transports them to an inspection position (not shown), where they are inspected.

The lifting assembly 8 comprises a series of pins 20 arranged in a plurality of rows shiftable relative to each other. The pins 20 are also movable vertically so that, when the lifting assembly 8 is lowered onto the row of containers 2, the pins 23 which strike the bottoms 3 of the container 2 are raised and the pins 21 which do not strike the container fall along the sides of the containers 2. When the rows 22 of pins 20 are shifted relative to each other, the pins 21 which are along the sides of the containers 2 engage the sides of the containers to grip the containers and hold them tightly.

With the pins 21 gripping the containers in the manner set forth above, the lifting assembly 8 is lifted by the arm 12 from the lifting position shown in full lines in Fig. 2 to the delivery position shown in broken lines in Fig. 2 to lift the row of containers 2 from the conveyor 4 and deposit them on the dead plate 10. When the containers are deposited in the dead plate 10, the rows of pins 22 are shifted back to their original position to disengage the pins 21 from the containers 2 and release the containers 2. The lifting assembly 8 is then returned to its original position shown in full lines in Fig. 2 to grip another row of containers which has been presented to the unloading station 6 by the conveyor 4 and simultaneously with the return of assembly 8 to its original position, the containers 2 on the dead plate 10 are pushed on to the conveyor 14 by a pusher 16.

Lifting assembly

Referring more particularly to Fig. 1, the lifting assembly 8 for picking up a row of containers, comprises a pair of frame members 60 which are mounted on brackets 68 and cross members 62 connecting the ends of the frame members. In order to adjust the lifting assembly vertically to permit it to grasp containers of different heights, a threaded member or screw 66 (Fig. 3) is rotatably mounted in each end bracket 68 and threadedly con-

nected to the cross member 62 so that the screw 66 may be rotated to raise or lower the lifting assembly 8 as may be desired for different heights of containers.

Interposed between the frame members 60 are a plurality of elongated sliding bars 64 having a series of openings 70 therein to slidably accommodate pins 20. The pins 20 are slidable vertically within the openings 70 so that when the assembly is placed over a row of inverted containers 2, those pins which strike the bottoms 3 of the containers, for example pins 23 (Fig. 3) will be raised, and those pins which do not strike the bottoms 3 of the containers 2, for example pins 21 (Fig. 3) will fall along the sides of the containers. When the bars 64 are shifted relative to each other, the pins 21 along the sides of the containers engage the sides of the containers to grip the containers and hold them tightly.

The lower ends of the pins 20 may be provided with rubber tips 20*a* to prevent the pins from damaging the glass containers and to permit the pins to grasp the containers 2 with a firm grip.

The bars 64 are adapted to be horizontally shifted relative to each other to permit the pins 20 to grasp the sides of the containers 2. Alternate bars 64 are adapted to be shifted in opposite directions so that a plurality of pins grasp the sides of the containers. Referring more particularly to Fig. 4, alternate pins 21*a*, move toward the containers in one direction to bear against one side thereof. Pins 21*b* between the paths of the pins 21*a* are moved in the opposite direction to bear against the opposite side thereof and in cooperation with the pins 21*a* grasp the container 2 securely.

The bars 64 and the pins thereon are adapted to be shifted horizontally in opposite directions relative to each other by any known or conventional manner. Figs. 1, 2, and 5 show one method of shifting the bars 64 and Figs. 1*a* and 7 show an alternate method which may be used for shifting the bars 64.

In Figs. 1, 2, and 5 a series of cams 72 are positioned in openings 74 in the bars 64. Each cam 72 has a cam surface 76 to push the respective bar 64 in which it lies. Cam surfaces 76 of adjacent cams 72 are oppositely directed so that adjacent bars 64 will be shifted in opposite directions upon rotation of the cams 72.

The cams 72 for the bars 64 are rotated by a solenoid 78 (Fig. 1) mounted on the frame member 60 through the intermediation of a solenoid armature 86, a pair of arms 84 and 82, and a shaft 80 on which the cams 72 are fixedly mounted.

When the solenoid 78 is energized, the armature 86 and the arm 84 will be retracted to pull the arm 82 and thereby rotate shaft 80 and the cams 72. Since the cam surfaces 76 of adjacent bars 64 are oppositely directed, the bars 64 will be shifted in opposite directions relative to each other. When the solenoid 78 is de-energized, the arms 86 and 84 will return to their normal positions by a spring 87 surrounding the solenoid armature 86 to reverse the operation and thereby return the bars 64 back to their normal positions and disengage the pins 21 from the sides of the containers 2 to release them.

The solenoid 78 may be energized by any means well known in the prior art. One manner of energizing and de-energizing the solenoid 78 for engaging and disengaging the pins 20 from the containers 2 is shown in Fig. 2. A pair of switches 90 and 92 are mounted on the standards 50 and have spring biased contacts 91 and 93 respectively in the path of the arm 12 to be struck thereby to energize and de-energize the solenoid 78, respectively. When the arm 12 strikes the switch 90, the solenoid 78 is energized and the cams 72 shift the bars 64 and the pins 20 to permit the pins 21 which are along the sides of the containers 2 to bear against the containers and grip the containers 2. The solenoid 78 will remain energized until the arm 12 has travelled 180° from the full line position in Fig. 2 to the broken line position in Fig. 2 and deposits the containers 2 on the dead plate 10. At that time, the arm 12 strikes the switch 92 which de-energizes the solenoid 76 and permits the bars 64 to return to the original positions, thereby releasing the containers 2 and leaving them standing on the dead plate 10.

Fig. 6 illustrates a circuit which may be used to energize and de-energize the solenoid 78. The circuit comprises a source of power 89, shown as a battery, and a relay coil 95. The switch 90 is normally open and switch 92 is normally closed. When the switch 90 is closed by having its contact 91 struck by the arm 12, the circuit will be closed thus energizing the solenoid 78 to shift the pins 20 relative to each other and closing the relay contacts 99 to close the relay circuit. When the arm 12 is raised out of contact with the switch 90, the switch is opened, however, the relay contacts 99 remain closed until the arm strikes the contact 93 of the normally closed switch 92 which is opened to break the circuit and de-energize the solenoid 78 to shift the pins 20 back to their original positions by the action of the spring 87.

Figs. 1*a* and 7 show an alternate method for shifting the pins 20. The sliding bars 64 are each provided with a central opening 150. Alternate bars 64*a* are provided with lower elongated openings 151 located below the central openings 150 and upper reduced openings 152 located above the central openings 150 in alignment with elongated openings 153. Alternate bars 64*b* are provided with upper elongated openings 153 located above the central openings 150 and lower reduced openings 154 located below the central openings 150 in alignment with elongated openings 151. A lever 155 is mounted in the openings in the bars 64 by means of pins 156, 157, and 158. The central pin 156 extends through the central openings 150 in bars 64 and acts as a pivot for the lever 155. The lower pin 157 extends through lower elongated openings 151 in bars 64*a* and lower reduced openings 154 in bars 64*b* so that the lower pin 157 lies snugly in the lower reduced openings 154 of bars 64*b* and loosely in lower elongated openings 151 in bars 64*a*. The upper pin 158 extends through upper elongated openings 153 in bars 64*b* and through upper reduced openings 152 in bars 64*a* so that the upper pin 158 lies snugly in upper reduced openings 152 and lies loosely in upper elongated openings 153.

To shift the bars 64*a* and 64*b* and the pins 20 therein to grasp a container the lever 155 is pivoted in one direction around the pin 156 lying in central opening 150 to thereby move the lower pin 157 in one direction and the upper pin 158 in the opposite direction. The lower pins 157 will abut against the lower reduced openings 154 on bars 64*b* and will slide along lower elongated openings 151 to thereby move the bars 64*b* in one direction. The upper pins 158 will abut against the upper reduced openings 152 on bars 64*a* and slide along upper elongated openings 153 to thereby move the bars 64*a* in the opposite direction. This will shift the bars 64*a* and 64*b* and the pins 20 thereon relative to each other to grasp a container. When the container is to be released, the lever 155 is pivoted in the opposite direction and the operations are reversed to shift bars 64*a* and 65*b* back to their original position.

The lever 155 is adapted to be pivoted by means of an air cylinder 160 (Fig. 1*a*) mounted on the frame of the apparatus through the intermediate of a piston 161 therein and a piston rod 162 mounted on piston 161 and on the lever 155 at 163. When air under pressure is introduced into air cylinder 160 on one side of piston 161 through, for example, air conduit 164, the piston 161 moves in one direction to pivot the lever 155 on pin 156 and thereby shift the bars 64*a* and 64*b* in one direction relative to each other to grasp a container. When a container is to be released, air is introduced into air

cylinder 160 on the other side of piston 161 through, for example, air conduit 165, to move the piston in the opposite direction and to shift the bars 64*a* and 64*b* back to their original positions.

In order to prevent the elevated pins 23 which strike the bottom 3 of a container 2 from dropping when the bars 64 are shifted by cams 72, a plurality of permanent magnets 94 are provided above the pin assembly to engage the tops of pins 20 and retain the pins 20 in their raised positions (Fig. 5). The permanent magnets are attached to a stationary frame member 96 supported above the assembly by standards 97. An adjustable bar 98 is interposed between the permanent magnets 94 and the tops of pins 20 and through which the magnetic force of the magnets is effective to hold the pins 23 raised. The bar 98 is adapted to slide downwardly on the standards 97 to the dotted line position in Fig. 5 to thereby push the raised pins 23 away from the permanent magnets 94 and release the pins 23 from the magnetic force of the magnets to permit them to drop of their own weight to their normal positions.

The bar 98 may be pulled downwardly to release the pins 23 by any well known means in the prior art. Fig. 3 shows one method of lowering the bar 98 and Figs. 3*a* and 8 show another method.

Referring more particularly to Fig. 3, a solenoid 100 is provided having its armature 101 coupled to bar 98. When the solenoid is energized, the armature 101 is retracted and the bar 98 is forced downwardly out of contact with the magnets 94.

The solenoid 100 may be energized by a switch assembly 102 mounted on the frame bracket 51 of the machine. The switch assembly 102 comprises a stationary contact 104 permanently mounted on a frame bracket 51 and a movable contact 106 mounted on an arm 108 pivotally mounted to swing on the bracket 51. The arm 108 is in the path of the arm 12 and is adapted to be struck by the transfer arm 12 as the arm 12 travels through an angle of 180°. The pivoted contact arm 108 is so positioned that if it is struck on one side thereof, it will swing to move the contact 106 away from the contact 104, whereas if it is struck from the opposite side thereof, it will swing to move the contact 106 against the contact 104. As the transfer arm 12 travels from the pick-up position shown in full lines in Fig. 2 to the delivery position shown in broken lines, it strikes the contact arm 108 which swings to push the contact 106 away from the contact 104. After depositing the containers 2 on the dead plate 10, the arm 12 returns to its original position and in its travel, strikes the arm 108 which swings to move the movable contact 106 against the contact 102 to close a circuit which energizes the solenoid 100 and permits the armature 110 of the solenoid to be retracted into the coil to pull the bar 98 out of contact with the magnets 94 and permits the pins 23 to fall to their normal positions.

Figs. 3*a* and 8 show another method of lowering the bar 98. A pusher bracket 170 is mounted on the bar 98 which is adapted to be pushed downwardly to move the bar 98 away from the permanent magnets 94. The bracket 170 is moved downwardly by means of the air cylinder 171 through the intermediation of the piston rod 172, slide member 173, and bell crank lever 174. The piston rod 172 is mounted on the slide member 173 by means of bolt 175 so that when the piston rod 172 is moved, it will permit the slide member 173 to slide. The bell crank lever 174 is pivoted on standard 176 by means of pin 177 and has one pair of legs 178 mounted in slot 179 in slide member 173 and its other leg 180 pivotally mounted on the pusher bracket 170 by means of pin 181. When air is introduced in the air cylinder 171 on one side of its piston (not shown) the piston rod 172 will be retracted to slide the slide member 173 toward the cylinder 171 and pivot the legs 180 of crank levers 174 downwardly around pivot 177 to depress the pusher bracket 170 and push the bar 98 away from permanent magnets 94 and thereby permit the raised pins 23 to drop. When air is introduced into the air cylinder 171 on the opposite sides of its piston (not shown) the piston rod 172 is thrust forward thereby reversing the operations and raising the bar 98.

While the drawings show that the pins may be shifted and the bar 98 may be pulled down by either an air cylinder or by a solenoid, it will be understood that it is within the scope of the present invention to use any means for shifting the pins and for pulling the bar 98 away from the permanent magnets.

Transfer mechanism

The mechanism for transferring the lifting assembly 8 from the pick-up station 6 to the delivery station 10 comprises a pair of arms 12 (only one arm being shown in the drawings) mounted to turn on a shaft 28 and having each end of the lifting assembly 8 journalled thereon by means of a pin 30. The arm 12 is fixedly attached to a gear 32 (Fig. 1) by the bolts 34 so that when gear 32 is rotated back and forth by a section gear 46 the arm 12 will be oscillated through an angle of 180° to transfer the lifting assembly 8 from the position shown in full lines in Fig. 2 to the position shown in broken lines and back again.

In order to keep the lifting assembly 8 in its normal upright position, a sprocket wheel 56 is fixed to the frame bracket 51 and the shaft 28 and a similar sprocket wheel 58 of substantially the same size may be keyed to the pin 30. A sprocket chain 61 connects the sprocket wheels 56 and 58 so that when the arm 12 is rotated, the lifting assembly 8 is maintained substantially parallel to its original, preferably vertical, position in its travel from the unloading station 6 to the dead plate 10.

The gear 32 and transfer arm 12 to which it is attached is oscillated by a drive motor 36 through the intermediation of a drive shaft 38, a rotating arm 40 having pin 42 thereon, on oscillating slotted arm 44, and an oscillating section gear 46 which meshes with the gear 32. The section gear 46 is mounted on slotted arm 44 by means of bolts 54 and is journalled on a pin 45 so that it may be oscillated by the slotted arm 44.

The motor 36 is mounted on the frame members 48 supported by the standards 50 and rotates the arm 40 through the shaft 38. As the arm 40 rotates, the pin 42 slides in the slot 52 of the slotted arm 44 and rocks the arm 44 back and forth to oscillate the section gear 46 on pin 45. Section gear 46 meshes with and rotates the gear 32 to oscillate the arm 12 through an angle of 180°.

In order to push the containers 2 onto the conveyor 14 after the containers have been deposited on the dead plate 10 by the lifting assembly 8, a pusher 16 is mounted on a sliding slotted rack 53 (Fig. 2). The motion of the pusher 16 is synchronized with the rotation of the arm 12 so that the pusher 16 pushes the containers 2 onto the conveyor 14 only after the lifting device has deposited the containers onto the dead plate 10, i.e. when the arm 12 is returning from the delivery position shown in broken lines in Fig. 2 to the pick-up position shown in full lines.

The sliding rack 53 has a slot 59 therein to permit it to be slid on pins 55 by means of teeth 57 thereon meshing with the oscillating gear 32 fixed to transfer arm 12. The slide gear 53 is mounted with respect to the gear 32 in such a position, that when the arm 12 is moved from its broken line position to the full line position, the gear 32, moving counterclockwise, will mesh with teeth 57 to move the pusher 16 toward the right in Fig. 2. As the arm 12 returns from the full line position back to the dotted line position, the gear 32 will be rotated in a clockwise direction to retract the pusher 16. In this manner, the pusher 16 will op-

erate only after the lifting assembly 8 has deposited a row of containers on the dead plate 10.

Operation

The lehr conveyor 4 is advanced very slowly by rotation of the shaft 5 to present successive rows of containers 2 to the unloading station 6. When each row of containers reaches this position, the lifting assembly 8 carried by arm 12 is lowered on a row of containers 2. The pins on the lifting assembly 8 which strike the bottoms 3 of the containers 2, for example pins 23, are raised and remain raised by the permanent magnets 94. The pins which do not strike the bottoms of the containers, for example pins 21, fall along the sides thereof. When the assembly 8 is lowered on the containers 2, the bars 64 and the pins 20 are shifted relative to each other.

The pins 21*a* (Fig. 4) are shifted in one direction toward the side walls of the container 2 and bear against one side of the container 2. The pins 21*b* lie between the paths of the pins 21*a* and are shifted in the opposite direction to bear against the opposite sides of the container. The pressure exerted by the pins 21*a* and 21*b* on opposite sides of the container causes the container to be securely gripped by the pins 21*a* and 21*b* and permits the container to be lifted when the lifting assembly 8 is lifted by the arm 12. Since the raised pins 23 are held elevated by the magnets 94, they will not drop and interfere with the gripping action of the lowered pins 21*a* and 21*b* on the container 2.

If a container is broken it usually topples over on its side, the pins 21*a* and 21*b* will not grasp it, and it will drop into a suitable receptacle placed at the end of the conveyor 4 (Fig. 2).

The arm 12 is then oscillated through an angle of 180° by the rocking section gear 46 to transfer the lifting assembly 8 loaded with a row of containers 2 from the position 6 to the dead plate 10. The section gear 46 is rocked by the rotation of the shaft 38 through the intermediation of the arm 40 which rotates therewith and the pin 42 which rides in the slot 52 of the arm 44 to rock slotted arm 44 and the section gear 56 on the pin 45. The sprocket wheels 56 and 58 and sprocket chain 61 permit the lifting assembly 8 to remain vertical during the rotation of the arm 12 to permit the containers to be deposited on the plate 10 in the same position as when they were picked up from the unloading station 6.

To release the containers 2 when on the plate 10, the bars 64 are shifted back to their normal positions. The arm 12 is then rotated back through an angle of 180° to the original position by rocking the section gear 46 in the opposite direction and rotating the gear 32 in the opposite direction. In its rotation the gear 32 meshes with the rack 53 which moves the pusher 16 forward to push the containers 2 from the dead plate 10 to the conveyor 14 to be carried past inspection stations.

In order to permit the pins 23 which are held raised by the permanent magnets 94 to drop, the bar 98 is lowered out of contact with the magnets 94 to move the pins 23 out of the magnetic field of the magnets 94 and permit the pins 23 to drop.

It will be seen from the above that the present invention provides an unloader which will unload successive rows of containers and which will automatically reject much of the broken ware. Also, the unloader of the present invention will give a smooth operation and will permit the containers to move past a set of inspecting devices at a convenient speed to permit more efficient inspection of the containers.

As various changes may be made in the form, construction, and arrangement of the parts herein without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim:

1. In a container handling mechanism for lifting an inverted container from a container receiving station and depositing it at a container delivery station, a plurality of pins mounted for vertical movement on said container handling mechanism, some of said pins being adapted to strike the bottom of a container to raise the pins above said container and the remainder of said pins being adapted to lie along the sides of said container, said pins being movable in predetermined paths relative to each other, means for moving pins in adjacent paths toward each other along said predetermined paths to permit the pins along the sides of said container to bear against and grip the sides of the container to be lifted at the container receiving station, and means for moving said pins in adjacent paths in directions away from each other to become disengaged from the sides of a container and release said container at said container delivery station.

2. A container handling mechanism as claimed in claim 1, wherein a magnet is provided above said pins to hold the lifted pins in raised position.

3. A container handling mechanism, as claimed in claim 1, wherein a magnet is provided above said pins to hold said raised pins in raised position and wherein means are provided to release said pins from said magnet.

4. In a container handling mechanism for lifting a row of containers from a container receiving station and depositing them on a container delivery station, a plurality of pins arranged in a plurality of rows mounted on said container handling mechanism, said rows of pins being shiftable relative to each other in the direction of said rows, means for shifting adjacent rows of pins in opposite directions to move said pins toward each other and permit them to bear against and grasp said row of containers at the container receiving station and means for shifting said rows of pins back to their original positions to move the pins away from each other and release said row of containers at the container delivery station.

5. A container handling mechanism as claimed in claim 4, wherein said pins are mounted for vertical movement on a plurality of bars shiftable lengthwise relative to each other.

6. In a container handling mechanism for lifting a row of containers from a container receiving station and depositing them on a container delivery station, a plurality of pins mounted for vertical movement on a plurality of bars on said container handling mechanism, said bars being shiftable relative to each other, said bars having openings therein and cams in said openings, means for actuating said cams to shift adjacent bars in opposite directions to move said pins toward each other and permit them to bear against and grasp said row of containers at the container receiving station and means for actuating said cams to shift said bars back to their original positions to move the pins away from each other and release said row of containers at the container delivery station.

7. A container handling apparatus as set forth in claim 6, wherein a cam is provided for each bar and wherein adjacent cams have oppositely directed cam surfaces to shift adjacent bars relative to each other.

8. In a container handling mechanism for lifting a row of inverted containers from a container receiving station and depositing them at a container delivery station, a plurality of pins mounted for vertical movement on said container handling mechanism, some of said pins being adapted to strike the bottoms of said row of containers to be raised above the containers, and the remainder of said pins being adapted to lie along the sides of said containers, said pins being arranged in a plurality of rows, means for shifting adjacent rows of pins in one direction to move the pins in the direction of said rows

along the sides of the containers toward each other to bear against and grasp said containers at the container receiving station, and means for shifting said rows of pins in the opposite direction to move the pins away from each other and release said row of containers at the container delivery station.

9. A container handling mechanism as set forth in claim 8, wherein a magnet is provided above said pins to hold the raised pins in raised position.

10. A container handling mechanism as set forth in claim 8, wherein a magnet is provided to hold the raised pins in raised position and wherein means are provided to release said pins from said magnet after said containers have been released.

11. In a container handling mechanism for transferring containers from a container receiving station and depositing them on a container delivery station, a lifting assembly comprising a plurality of bars shiftable relative to each other, each bar having a plurality of openings therein to accommodate a plurality of vertically displaceable pins, said lifting assembly being adapted to be lowered on to a row of containers so that the pins which strike the bottoms of the containers will be raised above the containers and the pins which do not strike the containers will lie along the sides of the containers, means for shifting said bars lengthwise in one direction to move the pins along the sides of the containers toward each other to bear against and grasp said row of containers at the container receiving station, and means for shifting said bars lengthwise in the opposite direction to move said pins away from each other and release said row of containers at the container delivery station.

12. A container handling mechanism as claimed in claim 11, wherein permanent magnets are provided above said pins to hold the raised pins in raised positions.

13. In a container handling mechanism means for lifting a row of inverted containers from a container receiving station and depositing them at a container delivery station, a plurality of pins mounted for vertical movement on said container handling mechanism, some of said pins being adapted to strike the bottoms of said row of containers to be raised above the containers, and the remainder of said pins being adapted to lie along the sides of said containers, said pins being arranged in a plurality of rows, means for shifting adjacent rows of pins in one direction to move the pins along the sides of the containers toward each other to bear against and grasp said containers at the container receiving station, means for shifting said rows of pins in the opposite direction to move the pins away from each other and release said row of containers at the container delivery station, a magnet mounted on said mechanism to hold the raised pins in raised position, and releasing means being provided to release said pins from said magnet after containers have been released, said releasing means comprising a vertically movable bar interposed between said pins and said magnet, said bar being movable to push the pins away from said magnet to release the pins from the magnet.

14. In a container handling mechanism for transferring containers from a container receiving station and depositing them on a container delivery station, a lifting assembly

comprising a plurality of bars shiftable relative to each other, each bar having a plurality of openings therein to accommodate a plurality of vertically displaceable pins, said lifting assembly being adapted to be lowered onto a row of containers so that the pins which strike the bottoms of the containers will be raised above the containers and the pins which do not strike the containers will lie along the sides of the containers, means for shifting said bars in one direction to move the pins along the sides of the containers toward each other to bear against and grasp said row of containers at the container receiving station, means for shifting said bars, in the opposite direction to move said pins away from each other and release said row of containers at the container delivery station, and each bar having an opening therein to accommodate a cam, cams of adjacent bars having oppositely directed cam surfaces to shift said bars in opposite directions.

15. In a container handling mechanism means for transferring containers from a container receiving station and depositing them on a container delivery station, a lifting assembly comprising a plurality of bars shiftable relative to each other, each bar having a plurality of openings therein to accommodate a plurality of vertically displaceable pins, said lifting assembly being adapted to be lowered onto a row of containers so that the pins which strike the bottoms of the containers will be raised above the containers and the pins which do not strike the containers will lie along the sides of the containers, means for shifting said bars in one direction to move the pins along the sides of the containers toward each other to bear against and grasp said row of containers at the receiving station, means for shifting said bars in the opposite direction to move said pins away from each other and release said row of containers at the container delivery station, permanent magnets mounted above said pins to hold the raised pins in raised positions, and a movable plate interposed between said magnets and said pins, said plate being movable away from said magnets to move the pins out of the magnetic force of said magnets and thereby release said pins.

16. In a container handling mechanism for lifting a row of containers, a plurality of vertically displaceable pins arranged in a plurality of rows mounted on said container handling mechanism, said rows of pins being shiftable relative to each other in the direction of said rows, and means for shifting adjacent rows of pins in opposite directions to move said pins toward each other and permit them to bear against and grasp said row of containers.

References Cited in the file of this patent

UNITED STATES PATENTS

1,878,156	Lorenz	Sept. 20, 1932
1,957,719	Naugle et al.	May 8, 1934
2,228,298	Brotherson	Jan. 14, 1941
2,277,828	Morgan	Mar. 31, 1942
2,281,730	Thompson	May 5, 1942
2,488,826	Peebles	Nov. 22, 1949
2,611,612	Schmidt	Sept. 23, 1952
2,623,648	Rowe	Dec. 30, 1952
2,623,649	Rowe	Dec. 30, 1952