

Feb. 13, 1951

E. M. CLARK
QUANTITY BOTTLE LOADER FOR AUTOMATIC BEVERAGE
BOTTLE WASHING MACHINES

2,541,809

Filed Sept. 5, 1947

7 Sheets-Sheet 1

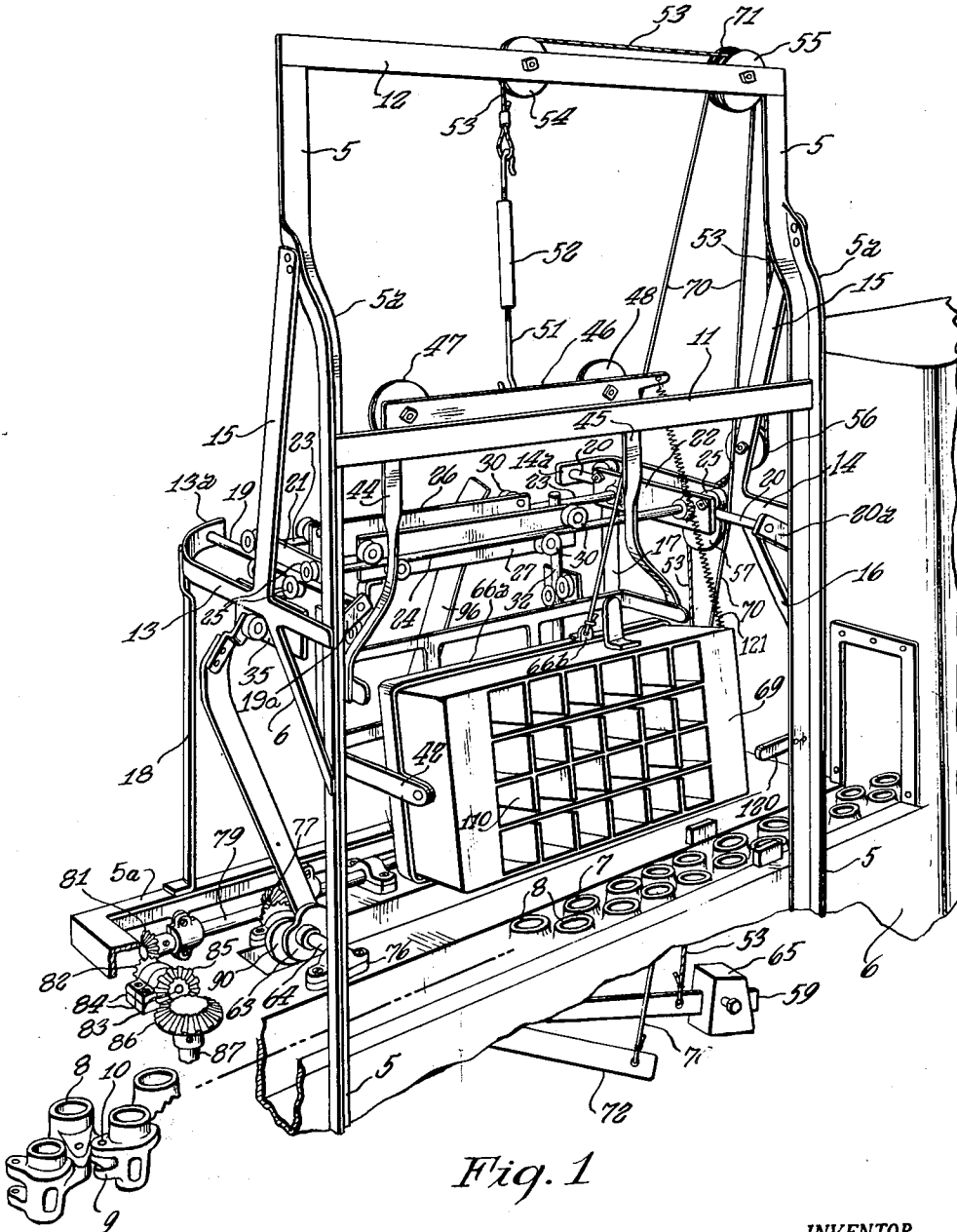


Fig. 1

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7 Sheets-Sheet 2

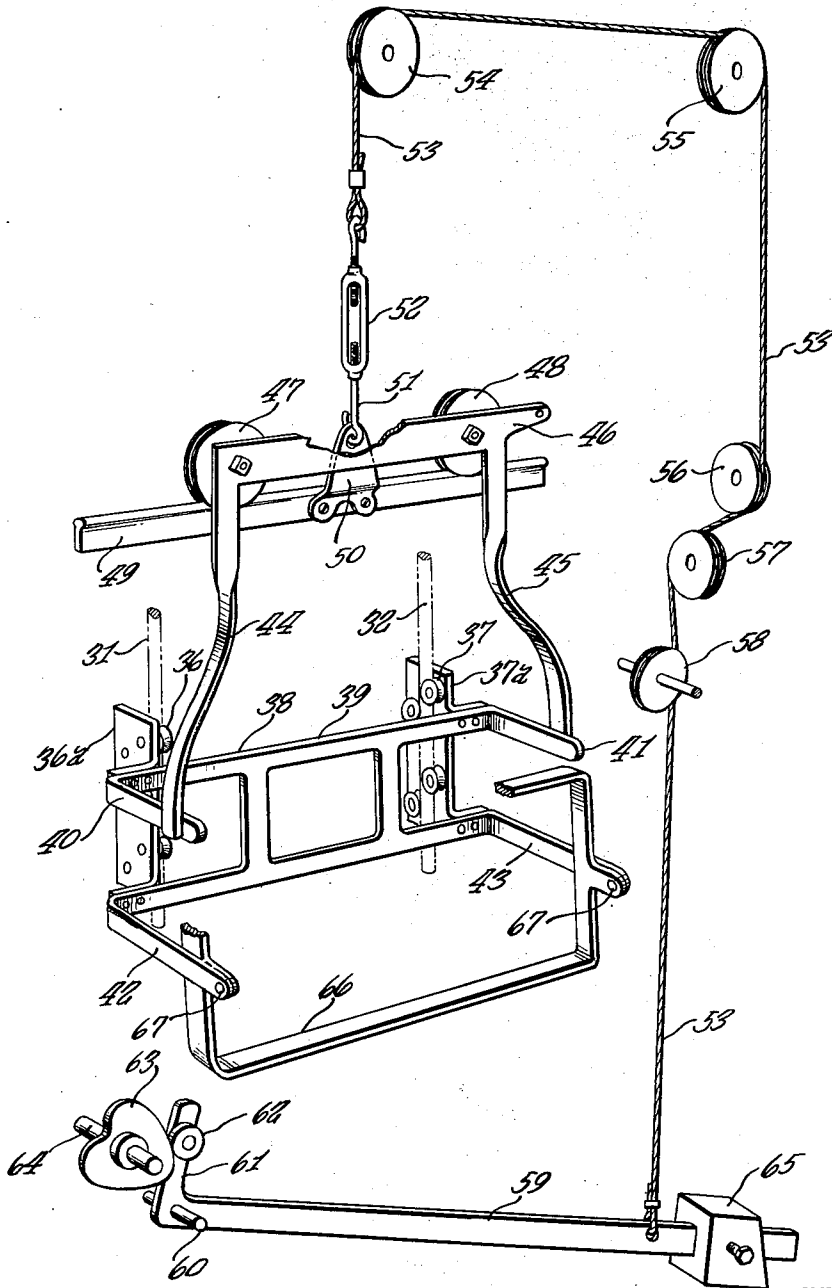


Fig. 2

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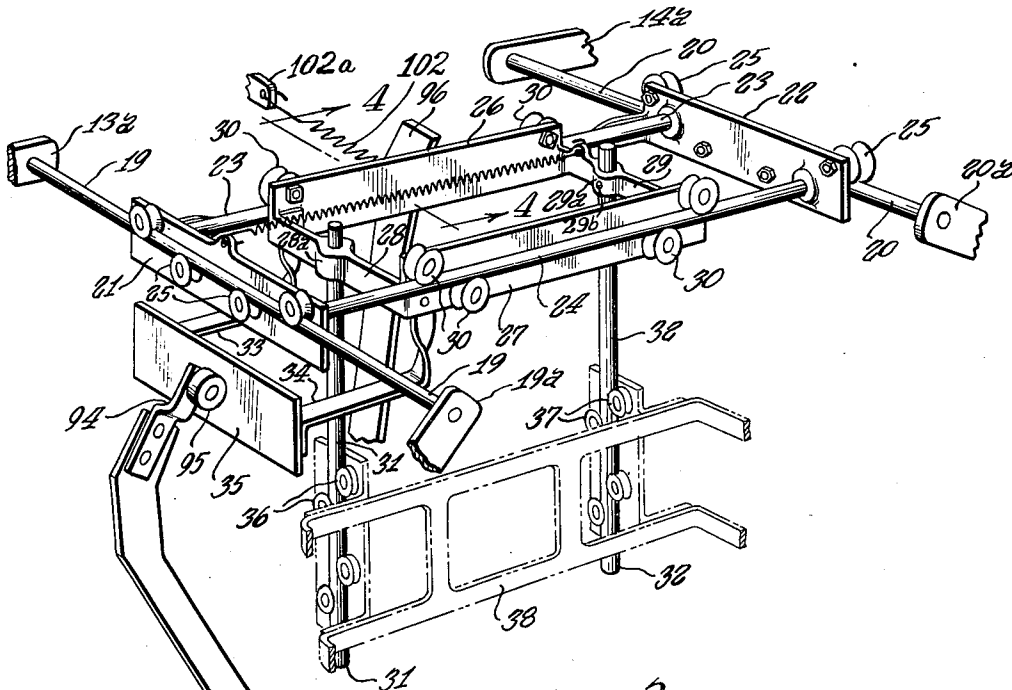


Fig. 3

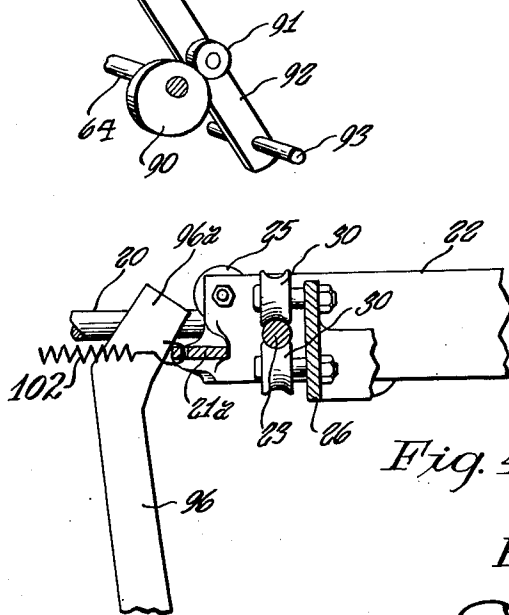


Fig. 4

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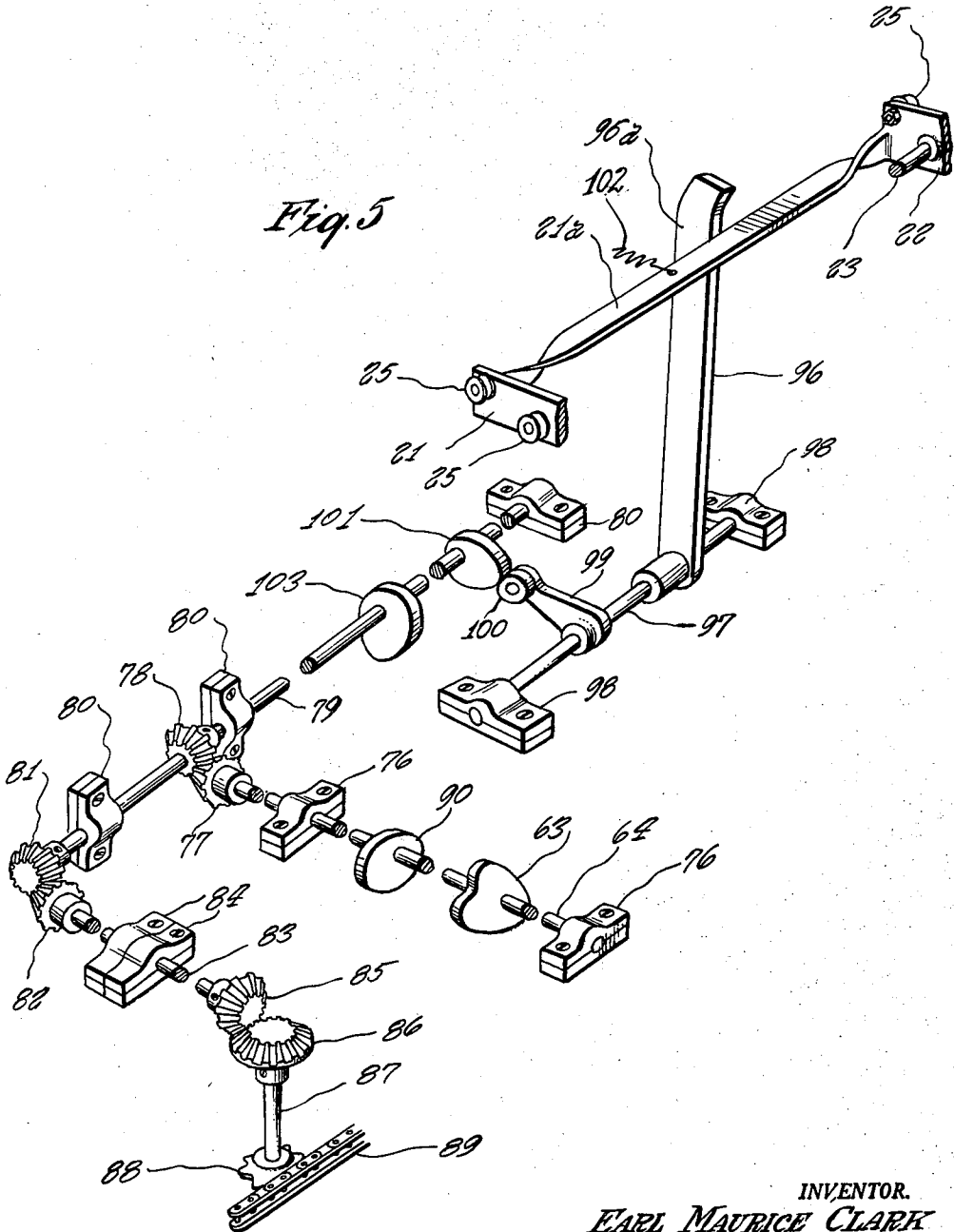
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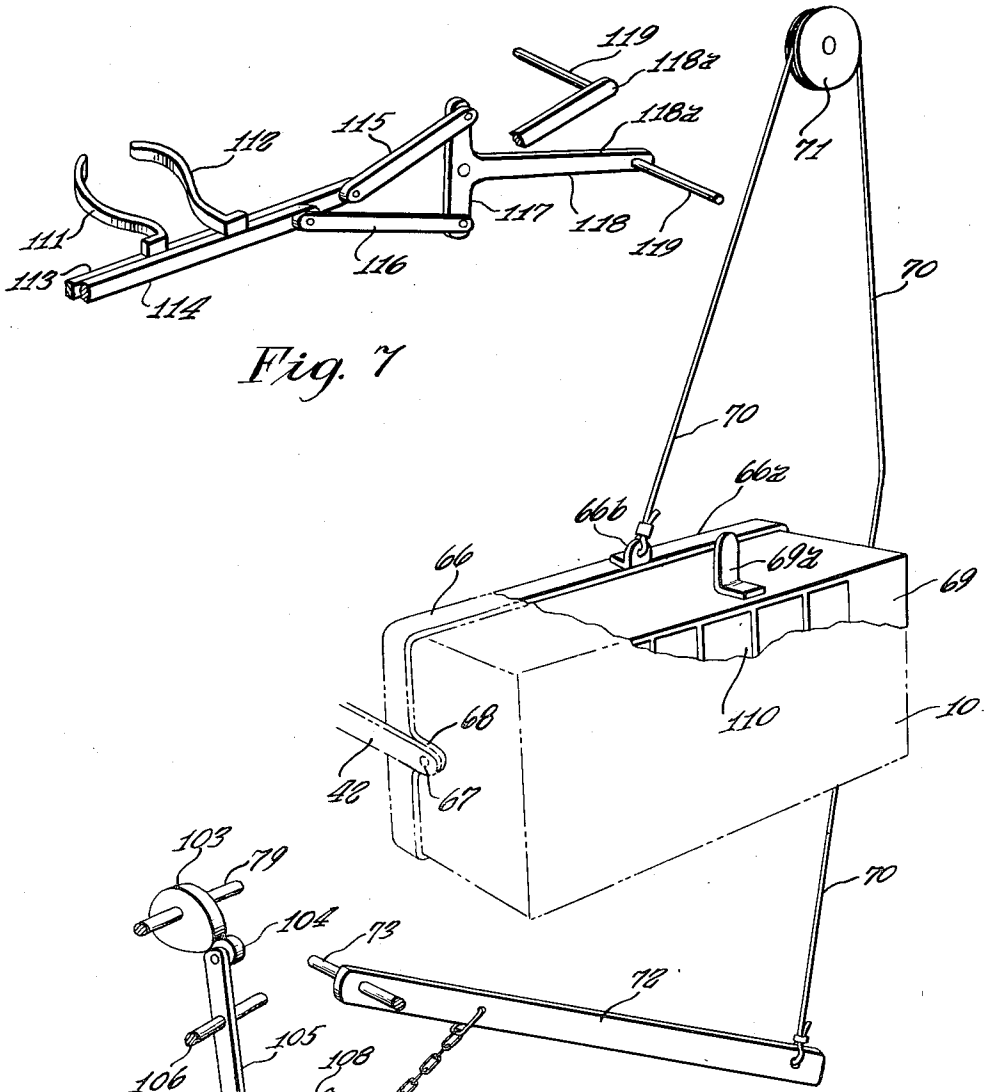


Fig. 7

Fig. 6

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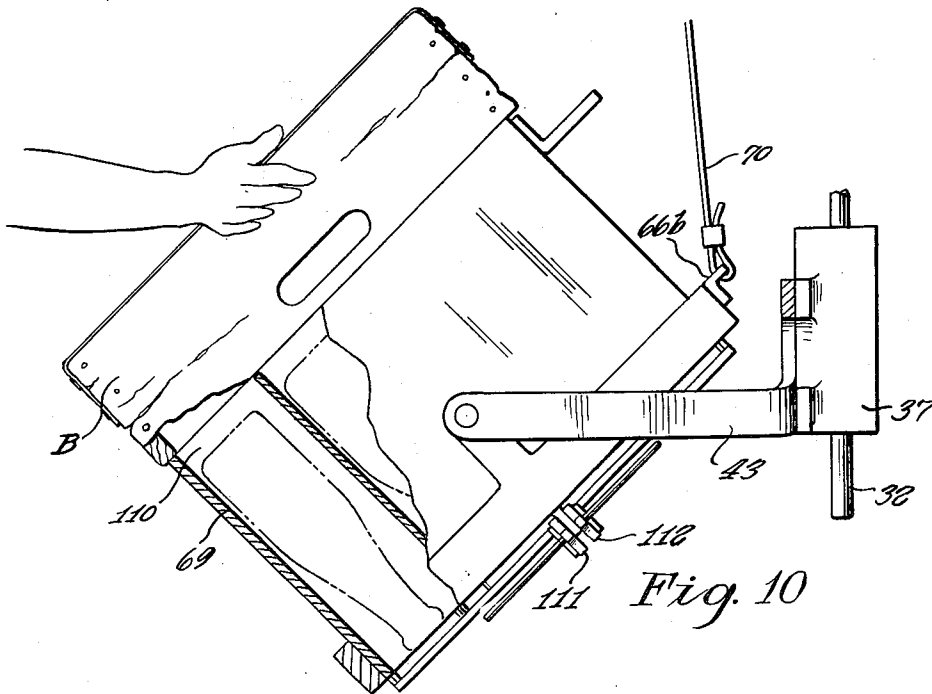


Fig. 10

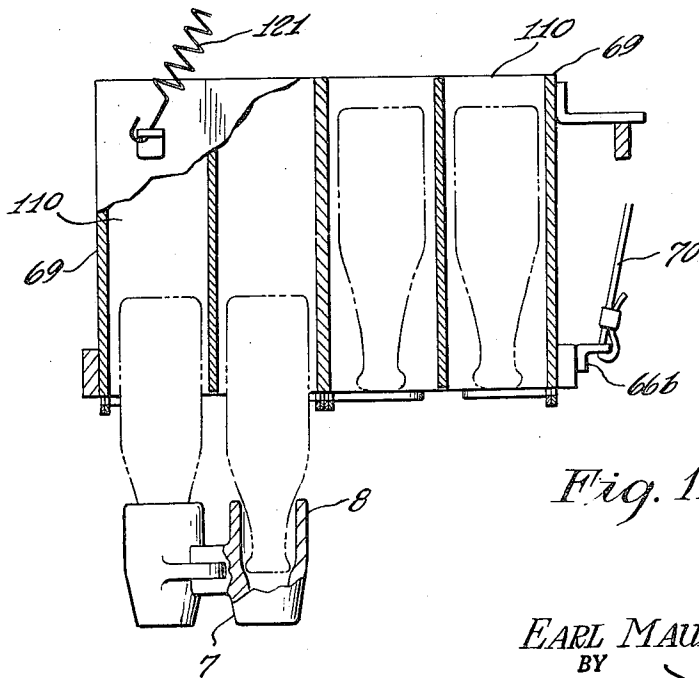


Fig. 11

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7 Sheets-Sheet 7

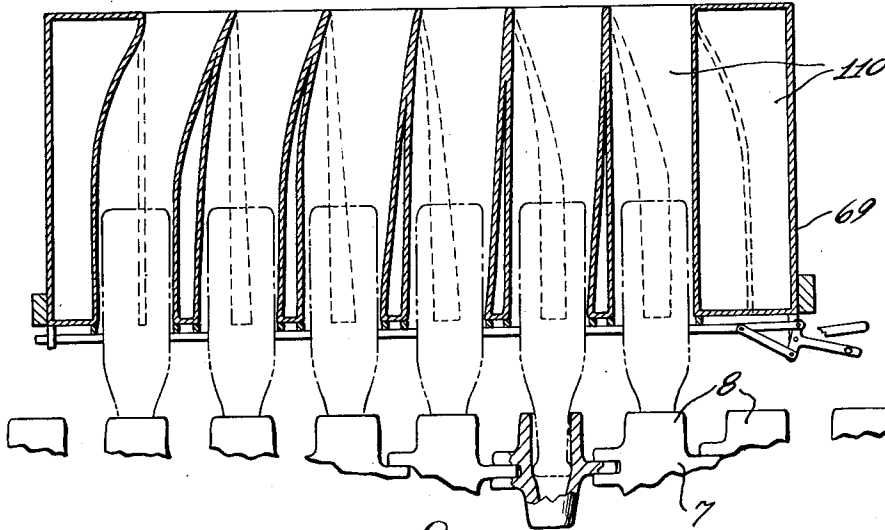


Fig. 9

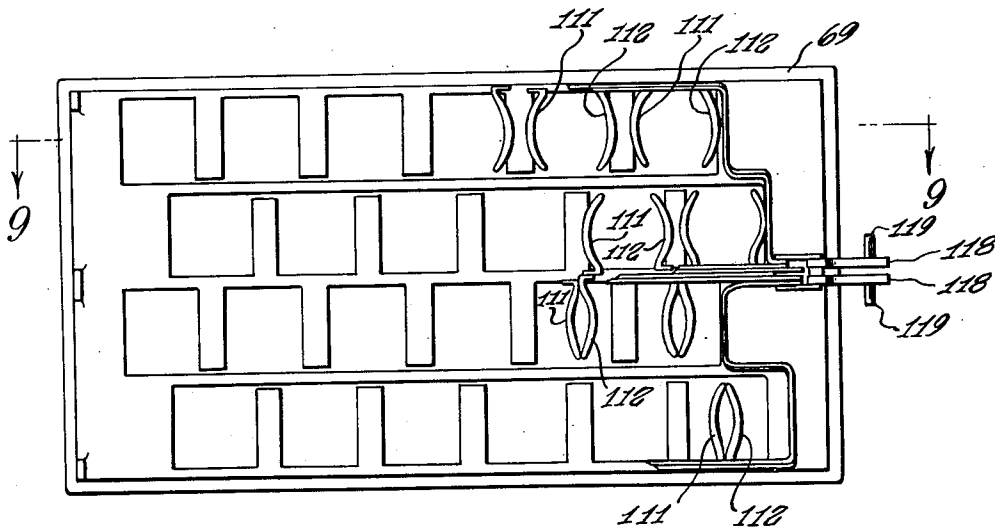


Fig. 8

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UNITED STATES PATENT OFFICE

2,541,809

QUANTITY BOTTLE LOADER FOR AUTOMATIC BEVERAGE BOTTLE WASHING MACHINES

Earl Maurice Clark, Kalispell, Mont., assignor of twenty-five per cent to Lee J. Lewis and twenty-five per cent to M. R. Johnson, both of Kalispell, Mont.

Application September 5, 1947, Serial No. 772,333

8 Claims. (Cl. 214-1)

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This invention relates to an improved machine for loading beverage bottles into beverage bottle washing machines, of the type which employs an endless carrier chain moving in an approximate horizontal plane, and generally known to the trade as Miller hydro bottle washers.

One of the objects of the invention is to provide an attachment for an automatic beverage bottle washing machine, which includes a cradle for receiving a dozen or more beverage bottles to be washed, means for inverting the cradle to deposit the bottles in groups of a dozen or a fixed number, and means for moving the cradle with its load of bottles in synchronism with the movement of the endless bottle washing chain, to permit of the discharge of the bottles into the receiving sockets or cups of the endless bottle washing chain conveyer.

Another object of the invention is the provision of a loading attachment for endless bottle washing conveyer chains, by means of which beverage bottles may be automatically unloaded from a commercial receptacle to the receiving cups or sockets of the endless chain and the operation repeated indefinitely.

Another object of the invention is to provide a cradle for the bottles to be loaded onto the endless conveyer chain which can hold two equal groups of beverage or other bottles to be washed, with means for inverting the cradle to dumping position, means for releasing one of the bottle groups to load the endless chain bottle washing conveyer, and means for shifting the cradle with reference to the conveyer chain, and for automatically releasing the second group of bottles to the conveyer chain, and means for returning the cradle to initial position to receive another load of two equal groups of beverage bottles to be washed.

With the above and other objects in view the invention comprises certain new and useful constructions, combinations and arrangements of parts, clearly described in the following specification, and fully illustrated in the drawings, in which:

Fig. 1 is a perspective view of the bottle unloading machine, showing the bottle carrying cradle partly inverted, and illustrating a section of the endless bottle conveyer chain of the conventional bottle washing machine, and details of the mechanism for driving the unloading mechanism.

Fig. 2 is a perspective view, showing the vertical slides for the cradle support, one of the

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horizontal tracks, and the means for elevating and lowering this track and the cradle.

Fig. 3 is a perspective view, showing the combined vertical slides and horizontal slides for cradle support, and the means for shifting the cradle support longitudinally in the direction of the length of the bottle conveyer chain.

Fig. 4 is a detail view, taken on line 4-4 of Fig. 3, showing the lever for shifting the cradle support laterally of the bottle conveyer chain, also showing certain parts in section.

Fig. 5 is an exploded perspective view, showing the main cam shafts, the driving gears for operating the same, and the lateral shifting lever, and its rock shaft.

Fig. 6 is a perspective view, showing the mechanism for inverting the bottle container to discharge its load.

Fig. 7 is a perspective view, showing a fragmentary detail of the means employed for releasing the bottles of any group of bottles arranged in the container.

Fig. 8 is a plan view of the container, indicating the position and action of the bottle releasing means.

Fig. 9 is a vertical sectional view, taken on line 9-9 of Fig. 8, looking in the direction of the arrows.

Fig. 10 is an end elevation of the bottle container, shown partly in section, and illustrating the manual effort of unloading a commercial box or container, so that the machine container will be loaded with its bottles.

Fig. 11 is a vertical sectional view through the machine container, showing the discharging action of one of the bottle groups into the receiving sockets of the endless conveyer chain of the bottle washing machine.

Referring to the drawings, which illustrate the practical embodiment of the invention, 5 designates a pair of spaced vertical frame supports which are suitably mounted on the frame of the conventional bottle washing machine 6, which includes the horizontally traveling endless conveyer chain 7, which is provided with a series of vertical sockets 8, formed on the chain links 9, which are pivotally connected, as by the pins 10.

The endless conveyer chain 7 travels continuously in a horizontal plane to carry bottles to be washed through the washing cycle, and it is necessary to deposit the bottles necks downwardly into the holding vertical sockets 8, so that water may be forced, together with the usual cleansing charges, into the bottles, and then allowed to

drain, and the rinsing water then flushed into the bottles and allowed to drain from them. The conveyor chain 7 can be operated by any mechanism adapted for the driving of such conveyors and forms a part of the washing machine 6. The speed of movement of the chain will be slow to allow for the movements of the operator of the bottle loader.

The vertical frame supports 5 are connected to each other by means of cross bars 11 and 12, the cross bar 12 being disposed above the cross bar 11, and offset from the vertical plane of the cross bar 11, by the offset portions 5a of the vertical frame supports 5.

Horizontal frame supporting bars 13 and 14 are connected to the vertical frame supports or uprights 5, and are provided with braces 15 and 16 to stiffen the frame thus built up. The outer end of the bar 13 is disposed at right angles at 13a to itself, and the outer end of the bar 14 is disposed at right angles 14a to itself. The bar 13 is also supported at its outer end by the vertical frame bar 18, and the bar 14 is supported by the vertical frame bar 17.

A horizontal round bar track 19 is supported at one end on the end 13a of the bar 13, and at the other end on the arm 19a, carried by the adjacent frame bar 5. Another horizontal and round bar track 20 is supported at one end on the end 14a of the bar 14, and at the other end by the arm 20a on the opposite vertical frame bar 5. These two bar tracks 19 and 20 are disposed in a common horizontal plane.

A carriage having side plates 21 and 22, and the round bar tracks 23 and 24, is slidably supported on the track bars 19 and 20, by means of the grooved rollers 25, pivotally supported on the side plates 21 and 22. Each side plate is provided with four such grooved rollers, two of each group of four engaging the upper side of its round bar track and two engaging the lower side of the same track.

On the round bar horizontal tracks 23 and 24 a second carriage, comprising the side plates 26 and 27, and the end plates or bars 28 and 29, which rigidly connect the side plates 26 and 27 to each other, Fig. 3. The side plates 26 and 27 are provided with grooved rollers 30, which engage the opposite sides of the round bar tracks 23 and 24, above and below the same. The end bars or plates 28 and 29 are provided with rigid sockets 28a and 29a which adjustably receive the upper ends of the vertical bars or supports 31 and 32. These bars are fixed in their adjusted positions within the sockets by set screws 29b.

The side plates 26 and 27 carry bracket arms 33 and 34, which are of L-shaped form, and the lower and outer ends of these bracket arms support a thrust plate 35, which is disposed in a vertical plane. The thrust plate serves to operate a long lever for the purpose hereinafter mentioned.

The vertical rods 31 and 32 provide vertical tracks for the free turning rollers 36 and 37 carried by the U-shaped cradle frame 38, Fig. 2, which includes a main frame section 39, and upper horizontally projecting end arms 40 and 41. The rollers 36 are carried directly by a vertical bar 36a, attached to the main frame section 39, and the rollers 37 are carried by a vertical bar 37a also attached to the same main frame section. The cradle frame also carries lower horizontal arms 42 and 43, disposed in a common horizontal plane, and opposite to each other.

The outer ends of the horizontal arms 40 and

41 are supported on the hanger bars 44 and 45, Fig. 2, which depend from the cross bar or carriage 46, which is provided with grooved rollers or wheels 47 and 48, pivoted to turn thereon, against the horizontal track 49, which is suspended by its central arm 50 from the hook 51, which is carried by turn buckle 52, supported on the steel cable 53, Figs. 1 and 2, which operates over the pulleys 54, 55, 56, 57, and 58, and which is connected by its lower end to lever 59, pivoted at 60, and provided with a short arm 61, which carries a cam follower roller 62, which engages motion transferring and timing cam 63, mounted on the shaft 64. A weight 65 is adjustable on the lever 59. This arrangement, as the cam 63 is rotated vertically, adjusts the cradle frame 38 on the vertical rods 31 and 32 by the lifting and lowering of the track 49.

On the outer ends of the lower horizontal arms 42 and 43 a rocker frame 66 is pivotally supported by the pins 67, which extend through short arms 68 of the rocker frame. This frame is rectangular in shape so as to receive a handling container or receptacle 69, Fig. 1. One side bar 66a of the rocker frame 66 is provided with a lug 66b, Figs. 1 and 6, to which cable 70 is connected. This cable travels on the pulley 71, and is connected to lever 72, which is pivoted on a shaft 73 fixed upon the machine base frame 5a in any suitable manner, and connected by the chain 74 with a rocker 75 for the purpose to be hereinafter set forth. The cable pulley 71 is mounted on the upper cross bar 12 of the frame.

The cross bar 12 also carries the pulley 54 of the cable 53, and a pulley 55 for the same cable, which is mounted to turn in axially centered position with the pulley 71.

The cam carrying shaft 64 is mounted to turn in bearings 76 on base frame 5a, and is provided with a bevel end gear 77, Figs. 1 and 5, which has driving engagement with bevel gear 78, on shaft 79, which is mounted to turn in bearings 80. The shaft 79 is equipped with an end bevel gear 81, which has driving engagement with the bevel gear 82 on shaft 83, which is mounted to turn in bearings 84. The shaft 83 is equipped with another end bevel gear 85, which has driving engagement with the bevel gear 86, on the vertical shaft 87, which is provided with a sprocket 88, engaged by driving conveyor chain 89 of the washing machine conveyor 7. Accordingly, driving mechanism is provided for the machine which in operation is responsive to the movement of the washing machine conveyor.

The shaft 64 carries a cam 90 which engages the follower roller 91 on the lever 92, which is mounted to rock on the shaft 93 carried on the machine base, Figs. 1 and 3. The upper end of this lever 92 is equipped with an arm 94 which carries a roller 95, which engages the thrust plate 35. The function of the lever 92 is to produce a longitudinal movement of the laterally shiftable carriage which includes the side plates 26 and 27, on the horizontal bar tracks 23 and 24. This causes the container 69 to move with the conveyor 7 while bottles are being transferred to the vertical conveyor sockets 8.

The side plates 21 and 22 are connected to each other by means of a twisted bar 21a, Fig. 5, which is engaged by the upper end of the lever 96, the lower end of which is mounted to rock on the shaft 97, supported in the bearings 98 on the base frame 5a. This shaft 97 carries a lever arm 99, which is provided with a cam follower roller 100, which engages the cam 101, on the shaft 79. The

upper end of the lever 96 is provided with a hook bend 96a so that it will slightly overhang the cross bar 21a. A coil spring 102 is connected at one end to the cross bar 21a and at the other end to an arm 102a carried by the frame, so that a pulling effort will be made on the side plates 21 and 22 to return them to the initial position after the shifting action imposed by the operation of the lever 96. The frame having the plates 21 and 22 will, through the lever 96, be moved toward the operator in timed relation to the conveyer.

The shaft 79 carries a cam 103 which engages the cam follower roller 104 on the lever 105, Figs. 5 and 6, which rocks on the shaft 106. The lower end of this lever is pivotally connected with the link 107, which is pivotally connected with the rocker 75, which is mounted on the shaft 108 pivoted on base frame 5a, shown in detail in perspective in Fig. 6.

The handling container 69, shown in Figs. 8, 9, 10 and 11, is positioned in the cradle frame 66, as indicated in Fig. 10. This handling container is provided with four parallel rows of bottle guiding passages or sockets 110, which are open at both ends. The individual sockets or passages of one row is disposed in staggered relation to the passages or sockets of the adjacent row, as shown in Fig. 8 for alignment with the respective staggered sockets of the conveyer.

The handling container 69 is loaded by inverting a commercial carrier container or box, indicated at B in Fig. 10, so that the twenty-four bottles of this box will be discharged by gravity into the handling container 69.

Discharge of the bottles which are disposed in the handling container 69 is controlled by means of a series of arcuate gripping jaws 111 and 112. The jaws 111 are carried by a rod or bar 113, and the jaws 112 are carried by the rod or bar 114, as shown in Fig. 7. The rod or bar 113 is pivotally connected with the link 115 and the rod or bar 114 is pivotally connected with the link 116. These two links are pivotally connected with the lever arms 117 of the T-shaped lever 118, which is pivoted midway of the ends of the lever arms 117, and provided with a long lever arm 118a, the outer end of which is equipped with an abutment bar 119. Under each of the four rows of six bottle passages a pair of these rods or bars and gripping jaws is arranged. These jaws are moved toward each other as shown in Fig. 8, and away from each other by rocking the T-shaped lever 118, so that the companion jaws of each pair of jaws will be simultaneously moved toward and away from each other.

The bottles in two adjacent rows of passages, numbering 12 bottles in all, are discharged at one time, and then the bottles in the adjacent twin rows are discharged at one time. The discharge in each case is made directly into the open vertical sockets of the endless washer chain 7, as indicated in Fig. 9.

The timing of the discharge of the first and second dozen group of bottles, and the shifting of the handling container 69 is controlled by the movement of the different cams, in synchronism with the movement of the endless conveyer washer chain 7, through the driving mechanism shown in Fig. 5. The abutment bar 119 of each T-shaped lever 118 is engaged by an abutment bar 120 mounted on the frame of the machine, and disposed in the path of the abutment bar 119. The handling container 69 is engaged by a coil spring 121, which acts to return the container to its original position.

At the start of the cycle of operations, the handling container 69 is supported so that the loading side of the same will be exposed in an inclined plane. The case or box of empty beverage or other bottles is then placed against the open upper side of the handling container 69 in an inverted manner and the bottles from the case or box are transferred to the container 69. The passages of this container are spaced apart on centers which will correspond to the center spacing of the vertical sockets 8 of the conveyer washer chain 7.

The next step or operation is to invert the container 69, so that the first dozen of empty beverage bottles are discharged to the receiving sockets 8 of the conveyer washer chain. The next step or operation is to cause the container 69 to rise so that it does not interfere with the movement of the conveyer washer chain 7, and all bottles of the first dozen group will be freed from the handling container 69. The next step is to shift the container 69 so that the second dozen bottle group will be moved into position for loading the conveyer washer chain, after which the container 69 is elevated and returned to its initial position.

All of the various devices for the movement of the receptacle to align the same with the conveyer sockets is effected automatically in sequence and in response to the movement of the conveyer chain and in timed relation therewith. The cam 63 of the mechanism will raise and lower the cradle frame 38. Cam 63 is so shaped to provide this movement at the proper time and at the proper speed. Cam 103 acting upon lever 105 will cause the cradle frame to be inverted so that the bottom openings of the receptacle retained by the cradle frame will be in vertical registration with the conveyer sockets. Only two rows at a time of these openings become so aligned upon the initial inverting of the cradle and its receptacle.

Cam 90 will accordingly cause the shifting movement of the cradle and the receptacle in the direction of movement of the conveyer and to travel for a short distance with the same. At the end of the stroke, the rods 119 for one pair of rows will be operated by the engagement with the abutment 120 so as to effect the discharge of the bottles to the conveyer sockets. Thereafter, the cradle and the receptacle are allowed to return as effected by the cam 90 and the cam 101 will so act upon the lever 96 to adjust the cradle toward the operator so that the second two rows of the bottles of the receptacle can be aligned with the conveyer chain. Thereafter, the cam 90 will again act to cause the movement of the cradle and the receptacle in the direction of the conveyer and thereafter the next rod 119 will engage the abutment 120 to release the next two rows of the bottles from the receptacle. Thereafter the cradle and the receptacle can be raised and the cradle uprighted all through the action of the cams to permit the next loading of bottles thereinto. Automatically the mechanism will go through the same steps again to discharge the new set of bottles which have been loaded into the receptacle. The operation is continuous and is in timed relation to the washer conveyer chain.

It is understood that the unloading machine may be used in connection with any traveling washer chain, and may be adapted for handling any type of bottles, whether used for beverages, milk or other fluids.

It is also understood that various changes in the details of construction, their combination,

and arrangement, may be made in carrying out the invention, as defined in the claims hereof.

Having described the invention, I claim as new:

1. In combination, an endless conveyer chain having a series of vertical bottle holding sockets, an unloader for automatically loading the sockets with inverted bottles to be washed, means operated by the conveyer chain for raising and lowering the unloader, means coacting therewith for releasing bottles from the unloader, means coacting therewith for inverting the unloader, means disposed in the path of the unloader for actuating said releasing means, and means for shifting the unloader in the direction of the travel of the endless conveyer chain.

2. In combination, an endless traveling bottle washing conveyer chain having a series of links each of which is provided with a vertical bottle holding socket, a receptacle supported over the conveyer chain for pivotal movement, means for moving the receptacle in the direction of travel of the conveyer chain, means operated from the conveyer chain for inverting the receptacle, and means coacting with the chain operated means for releasing bottles from the receptacle to the sockets of the conveyer chain.

3. The combination with a traveling endless bottle washer conveyer, of a cradle mounted to rock above the conveyer, a receptacle having a series of bottle holding passages opening on opposite sides of the receptacle mounted on the cradle, means operated by the conveyer for shifting the cradle and the receptacle in the direction of the movement of the conveyer, releasing means carried by the cradle for releasing bottles from the receptacle, means for raising and lowering the cradle and the receptacle, means for inverting the cradle and the receptacle to cause bottles held thereby to be held in position to be discharged to the conveyer, and means disposed in the path of the cradle and receptacle for releasing bottles on the inversion of the cradle and the receptacle.

4. The combination with a traveling endless conveyer having vertical sockets for holding bottles to be washed, a cradle mounted over the conveyer for pivotal movement, a receptacle supported on the cradle and provided with a series of passages each of which opens on the top and bottom of the receptacle, means coacting with the conveyer for inverting the cradle and its receptacle, and means cooperating therewith for advancing the cradle and its receptacle in the general direction of the travel of the conveyer.

5. The combination with a traveling endless conveyer having vertical bottle holding sockets, a cradle supported above the conveyer, a receptacle pivotally supported on the cradle, means for raising and lowering the cradle and the receptacle, oppositely moving releasing elements carried by the receptacle for releasing bottles from one side of the receptacle, means for inverting the cradle and its receptacle, and means for operating the elements.

6. The combination with a traveling bottle

washing conveyer, of a bottle loader associated with the conveyer and provided with a pivotally supported cradle, means for raising and lowering the cradle, means for shifting the cradle in the direction of movement of the conveyer, means for shifting the cradle lateral to said direction of movement, means for inverting the cradle, a receptacle supported on the cradle, bottle releasing elements carried by the receptacle, means disposed in the path of the movement of the receptacle and cradle for operating said release elements, and means synchronized with the movement of the conveyer for operating all of said means in timed relation to the movement of the conveyer, to cause said releasing elements to deposit bottles from the receptacle into the conveyer.

7. The combination with an endless traveling bottle washing conveyer having vertical bottle holding sockets therein, a receptacle having transverse passages spaced to correspond with the spacing of the conveyer sockets and opening from the opposite sides of the receptacle, means for tilting the receptacle above the conveyer, means for shifting the receptacle in the direction of movement of the conveyer, means for shifting the receptacle in a movement transverse to that of the conveyer, means for raising and lowering the receptacle, means for discharging a certain number of bottles loaded in the receptacle to the sockets of the conveyer, and means for discharging the balance of the bottles loaded on the receptacle to the sockets of the conveyer.

8. The combination with an endless traveling bottle washer conveyer having vertical bottle holding sockets, a cradle, a receptacle having bottle holding passages pivotally supported on the cradle, a track on which the cradle slides, a hoist for lowering and raising the track, means for shifting the receptacle in the direction of movement of the conveyer, means for shifting the receptacle in the direction at right angles to the movement of the conveyer, means for releasing certain bottles loaded on the receptacle and cradle, means for releasing the remaining bottles on the receptacle and cradle, and means operated in synchronism with the travel of the conveyer for operating all of said means to automatically transfer bottles from the receptacle to the sockets of the conveyer.

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