

Nov. 25, 1958

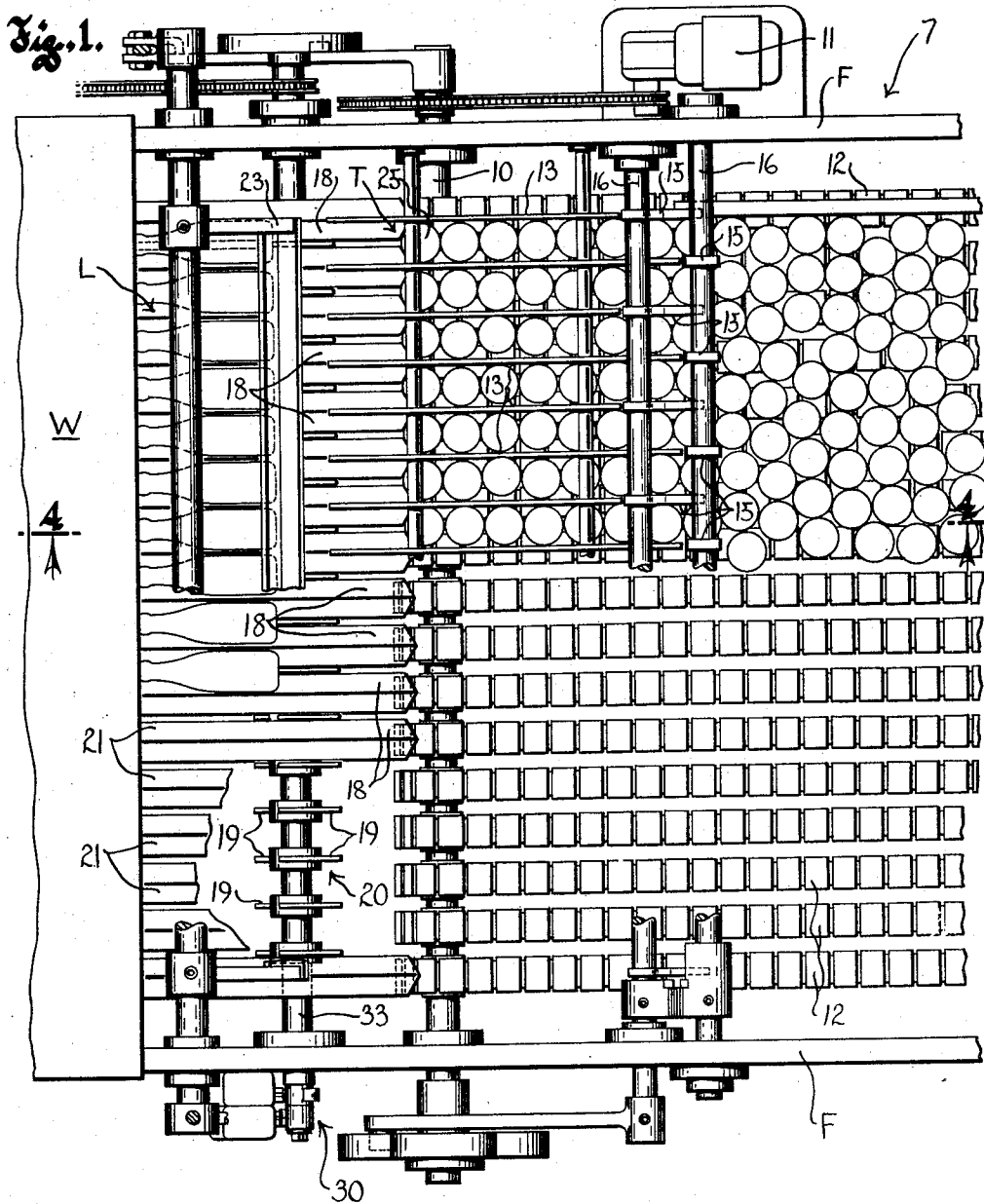
P. C. READ ET AL

2,861,670

LOADING APPARATUS FOR BOTTLE WASHING MACHINES

Filed March 16, 1956

5 Sheets-Sheet 1



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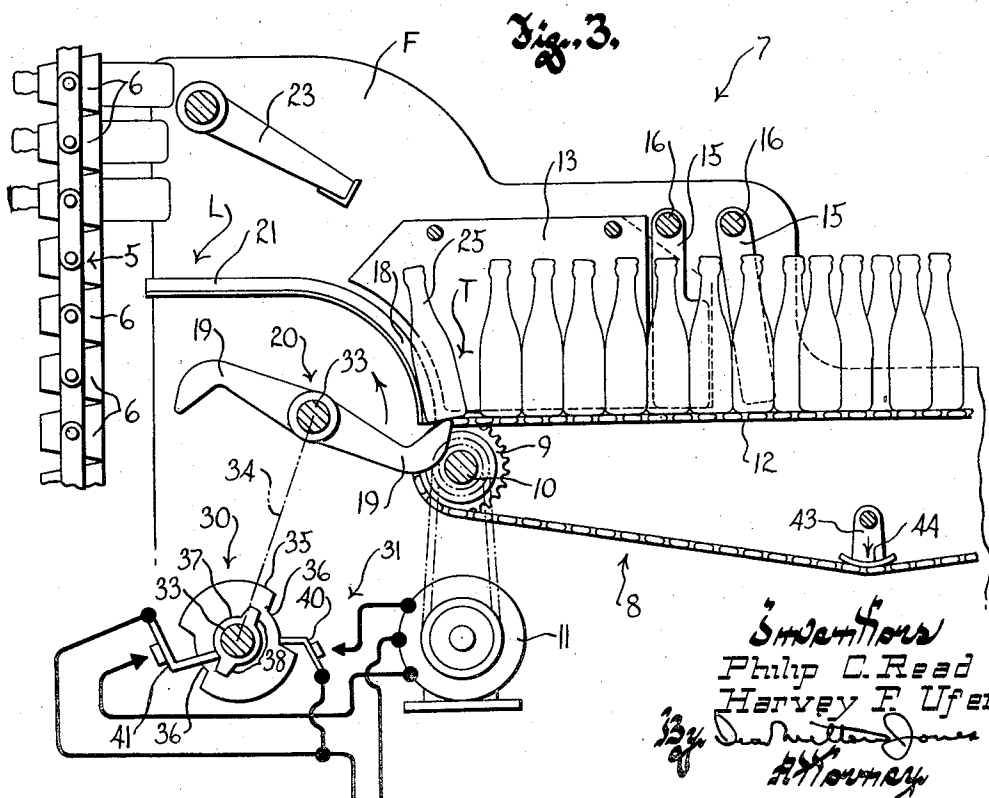
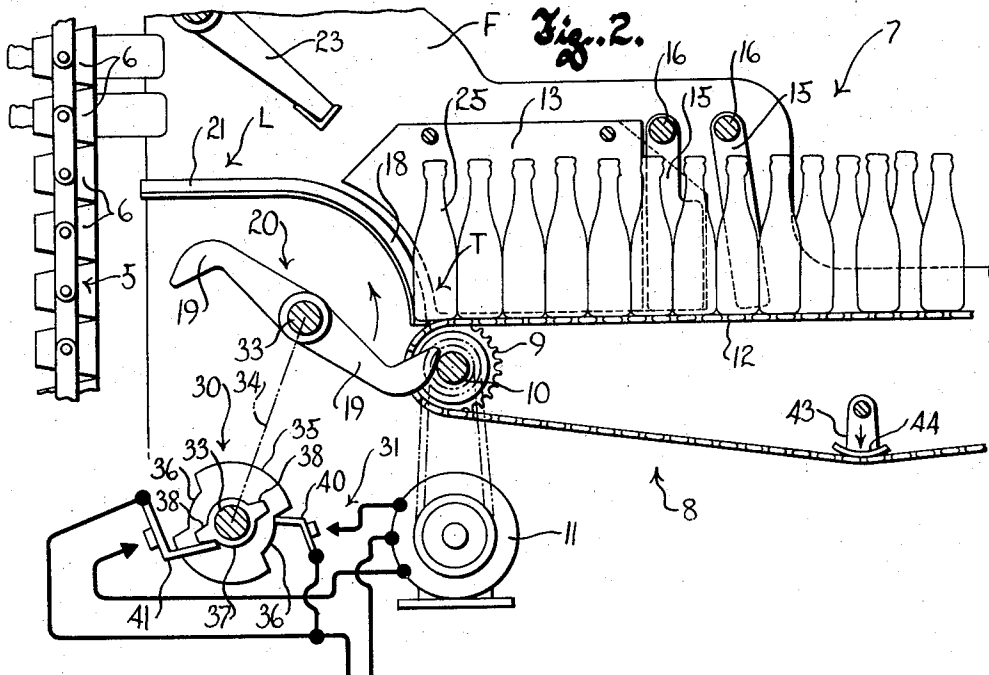
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LOADING APPARATUS FOR BOTTLE WASHING MACHINES

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5 Sheets-Sheet 2



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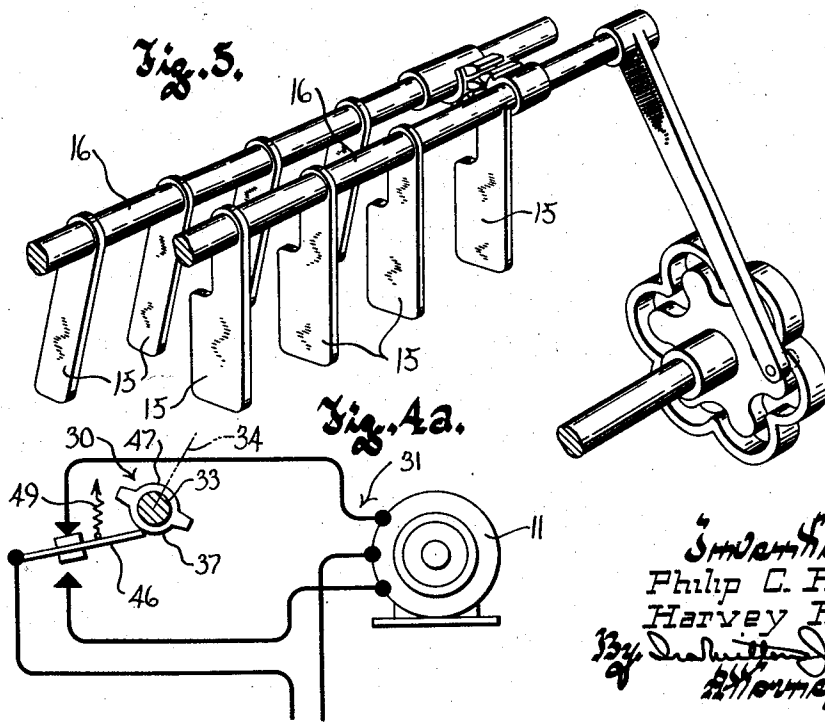
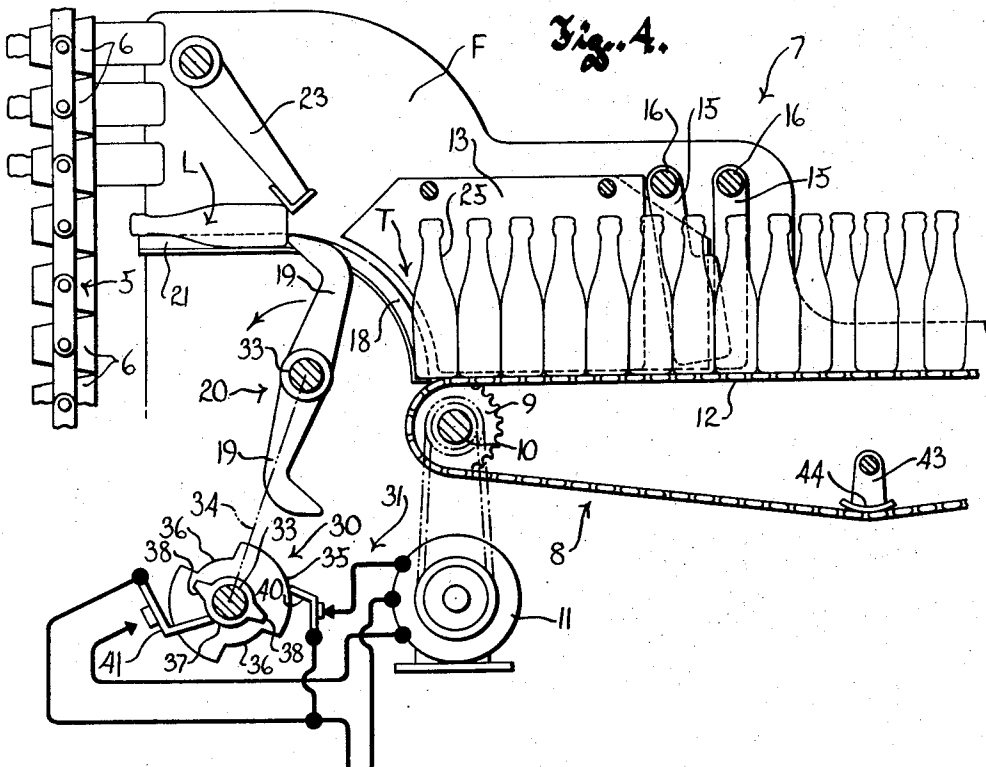
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LOADING APPARATUS FOR BOTTLE WASHING MACHINES

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5 Sheets-Sheet 3



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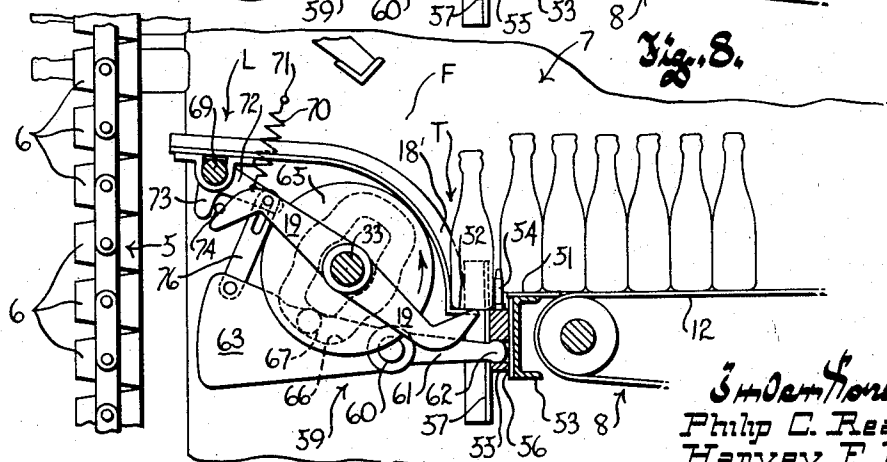
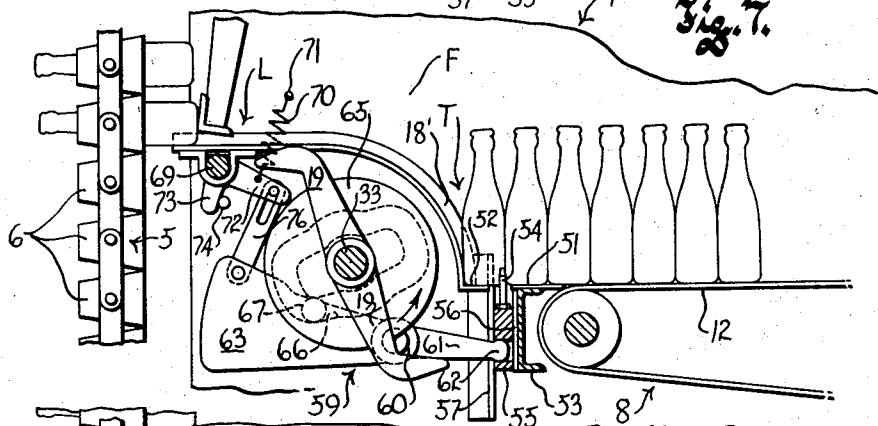
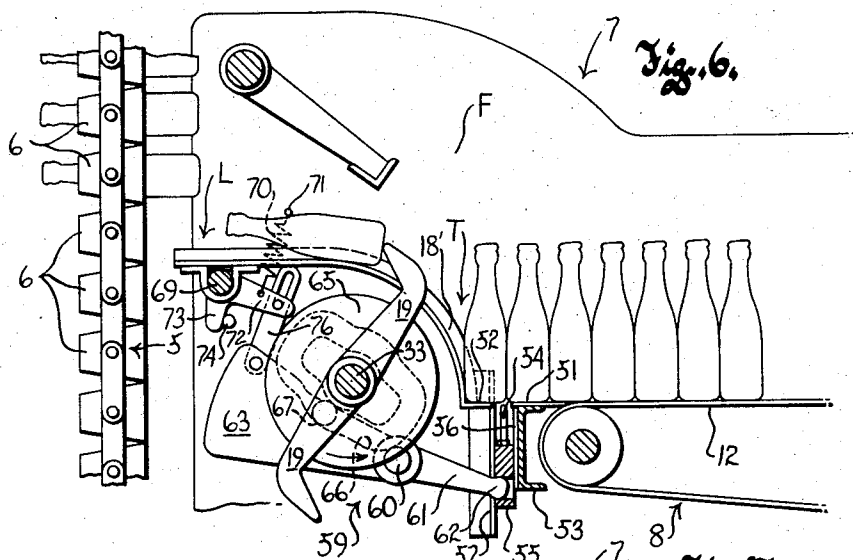
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LOADING APPARATUS FOR BOTTLE WASHING MACHINES

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5 Sheets-Sheet 4



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LOADING APPARATUS FOR BOTTLE WASHING MACHINES

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5 Sheets-Sheet 5

Fig. 9.

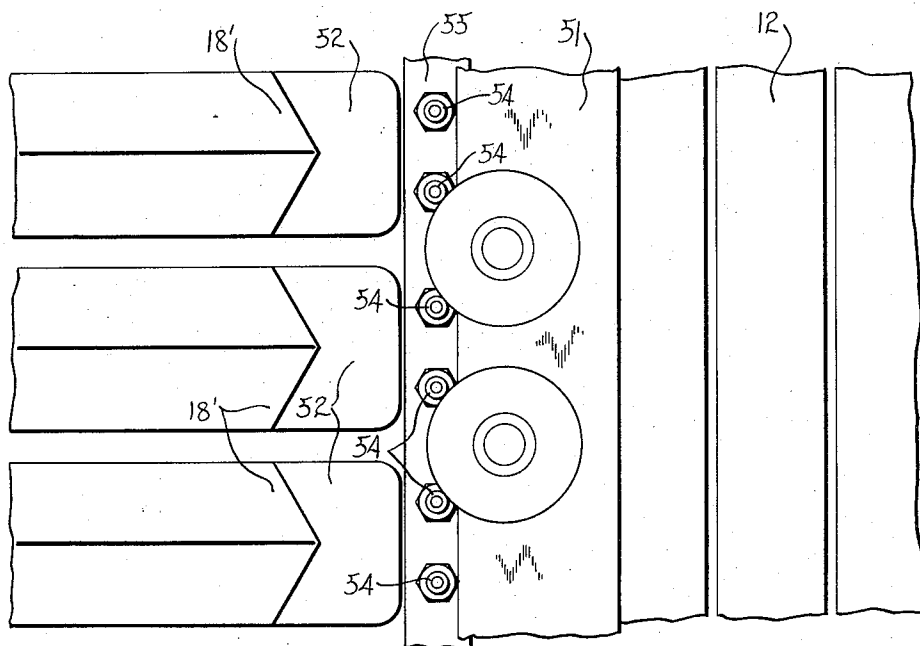
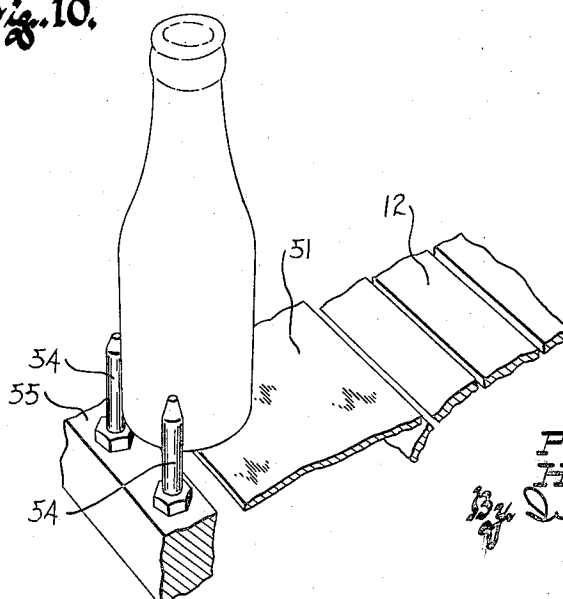


Fig. 10.



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LOADING APPARATUS FOR BOTTLE WASHING MACHINES

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7 Claims. (Cl. 198—25)

This invention relates to automatic bottle washing machines and has more particular reference to improvements in loading mechanism for such machines.

The loader of this invention is intended for bottle washing machines of the type in which bottles are conducted through the machine by a conveyor mechanism having transverse rows of bottle carriers or pockets constrained to travel upwardly past a loading station at which the bottles to be washed are moved into the bottle carrying pockets, neck first, from horizontal positions resting on their sides.

Loaders for washing machines of this type are usually provided with an endless conveyor to conduct bottles in upright positions along a substantially horizontal path, and include means for assuring delivery of the bottles in successive transverse rows to a transfer position at the front of the conveyor. The successive transverse rows of bottles delivered to the transfer position are lifted and conducted upwardly and forwardly along arcuate guide tracks shaped to effect tilting of the bottles over on to their sides to the horizontal position necessary for insertion into the bottle carrying pockets on the washer.

The loading conveyor, which is usually continuously driven, advances the bottles in the forward direction between longitudinal partitions which separate the indiscriminately loaded mass of bottles into straight longitudinal rows. The foremost bottles of these rows are lined up into orderly transverse rows at the front of the conveyor when they reach the transfer position by contact thereof with the obstruction provided by the upright rear portions of the arcuate guide tracks.

The means for lifting the bottles upwardly and forwardly along the guide tracks from the transfer position to horizontal positions ready for insertion into the bottle receiving pockets of the washing machine usually comprises a rotor revolving in synchronization with the washer conveyor and having arms thereon which engage the bottoms of the bottles to carry them from their transfer positions onto the horizontal upper portions of the tracks, thereby making room for the delivery of the next transverse row of bottles to the transfer position.

Conventional loading apparatus of the type described, though one of the more efficient types, has one serious defect in that the bottles handled thereby are subject to considerable scuffing, scratching and even cracking during the time the successive transverse rows of bottles are lifted from the transfer position and deposited upon the horizontal upper portions of the arcuate guide tracks. Such damage to the bottles to be washed results from the considerable force which bottles on the continuously driven loading conveyor exert on bottles at the transfer position to tightly press them against the upright rear portions of the arcuate guide tracks. Frequently, the pressure upon the bottles at the transfer position is of such intensity that when they are lifted from their transfer positions, they scrape against the bottles behind them and against the surfaces of the guide tracks with such force as to become scratched and sometimes broken, and

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they may even pop out of the loading apparatus when they reach a partly transferred, tilted position, by the force which bottles rearwardly thereof exert on their bottom portions. Needless to say, the resistance to lifting of the bottles out of the transfer position also results in an excessive waste of power.

It is an object of this invention, therefore, to provide bottle loading apparatus of the character described which overcomes the above objections and affords the utmost protection to the bottles handled thereby.

More specifically, it is an object of this invention to provide bottle loading apparatus of the character described in which the transfer of bottles from the transfer position is facilitated through the provision of means which effects stopping of the advancing motion of bottles rearwardly of those at the transfer position and then effects relative longitudinal motion between the bottles at the transfer position and those immediately behind them, to thereby assure that the bottles will be free of any restraining force thereon when they are moved out of the transfer position. In the preferred embodiment of the invention, this is achieved by movable control mechanism operating in synchronization with the rotor by which the bottles are lifted from the transfer position, and which in quick succession effects stopping and reversal of the loading conveyor a predetermined short distance to establish a space between the bottles at the transfer position and the bottles immediately therebehind, at a time just before the rotor arms engage the bottoms of the bottles so that the bottles may be easily lifted out of the transfer position and conducted onto the horizontal upper portions of the arcuate guide tracks without damage thereto.

In a modified embodiment, the movable control mechanism actuates a gate which blocks the forward advance of bottles immediately behind those at the transfer position, and then effects forward motion of the bottles at the transfer position relative to the bottles therebehind, just prior to the time the rotor arms engage the bottoms of the bottles and lift the same out of the transfer position.

With the above and other objects in view, which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

The accompanying drawings illustrate three complete examples of the physical embodiments of the invention constructed according to the best modes so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a plan view of the loading apparatus of this invention;

Figures 2, 3 and 4 are fragmentary, longitudinal sectional views taken through Figure 1 along the plane of the line 4—4, and illustrating the loading apparatus in different stages of operation;

Figure 4a is a diagrammatic view showing a slightly modified embodiment of the invention;

Figure 5 is a detail perspective view illustrating the means for directing bottles, loaded indiscriminately upon the conveyor, between spaced longitudinal partitions which assure orderly advance of the bottles toward the transfer position at the front of the conveyor;

Figures 6, 7 and 8 are longitudinal sectional views similar to Figures 2, 3 and 4, but illustrating another embodiment of the invention;

Figure 9 is an enlarged fragmentary plan view of a portion of the loading apparatus shown in Figures 6, 7 and 8; and

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Figure 10 is a fragmentary perspective view showing the manner in which the advancing motion of bottles behind those at the transfer position is blocked in the apparatus disclosed in Figures 6 through 9.

Referring now more particularly to the accompanying drawings in which like numerals designate like parts throughout the several views, the numeral 5 generally designates an endless conveyor such as employed in a conventional bottle washing machine W to conduct bottles to be washed through the machine. For this purpose, the conveyor is provided with transverse rows of bottle carriers or pockets 6. At the inlet end of the machine, these carriers or pockets are constrained to travel in a substantially vertical path, and while moving upwardly past a loading station L, bottles are fed therinto by the loading apparatus 7 of this invention.

The loading apparatus 7 follows the conventional in that it is provided with a horizontal conveyor 8 comprising a series of transversely spaced endless chains trained over front sprockets 9 and similar rear sprockets (not shown). Each set of sprockets, of course, is fixed to a cross shaft journaled in opposite side frames F, which may be extensions of the sides of the washer. The front shaft 10 is drivingly connected to an electric motor 11, and the upper stretch 12 of the conveyor may thus be driven forwardly in a horizontal path toward a transfer position T immediately ahead of the front sprockets and near the loading station L.

Bottles loaded indiscriminately in upright positions on the receiving end of the loading conveyor are conducted forwardly between stationary transversely equipped longitudinally extending partitions 13 to be maintained in orderly longitudinal rows thereby for presentation to the transfer position T at the front of the conveyor.

Elongated fingers 15 each in line with one of the partitions, are fixed to and depend from cross shafts 16 which are oscillated in opposite directions during operation of the apparatus, and these fingers act upon the bottles before they enter the spaces between the partitions and orient them for proper entry into the longitudinal channels defined by the partitions. Hence, manual manipulation of the bottles on the loading apparatus is unnecessary.

As is customary in bottle loading apparatus of this type, the conveyor advances the foremost bottles thereon against an obstruction defining the transfer position T, the obstruction being provided by the lower rear ends of a set of transversely spaced V-tracks 18. By such engagement with the tracks, the bottles are caused to be arranged in orderly transverse rows at the transfer position prior to being lifted upwardly and forwardly along the tracks by arms or fingers 19 on a continuously revolving rotor 20 driven by the washer in synchronization with the travel of conveyor 5 thereof. The bottles are carried by the rotor arms 19 to the loading station L provided by the horizontal upper portions 21 of the tracks 18.

The curvature of the tracks, of course, is such that the bottles are tilted from their upright positions at the transfer station to horizontal positions such as seen in Figure 4, with their necks projecting forwardly toward the bottle pockets 6 of the bottle washing machine. The bottles at the loading station are fed into the pockets 6 by arms 23 oscillated in synchronization with the rotor 20 and the conveyor 5 of the washer.

When the bottles in the foremost row 25 thereof are at the transfer position T, as seen in Figure 2, the bottles are tightly pressed against the lower rear portions of the arcuate guide tracks 18 by the bottles on the conveyor rearwardly thereof. It will be understood, of course, that while the upper stretch 12 of the conveyor does not have a positive driving connection with the bottles resting thereon, the weight of the advancing bottles nevertheless imposes a substantial force on the bottles in the foremost row 25, tending to clamp the same against the lower rear ends of the guide tracks. Obviously, the

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pressure which is exerted upon the bottles at the transfer position interferes with lifting of the bottles out of the transfer position by the arms 19 on the rotor during rotation thereof; and it is because of this pressure that the bottles were frequently scuffed and scraped and sometimes even broken during initial transfer thereof to the loading station L at the upper portions of the arcuately curved guide tracks.

The loading apparatus of this invention, however, overcomes this objection to past loaders of the character described, through the provision of means which first stops the advance of bottles on the conveyor, and directly thereafter effects relative longitudinal separating motion between the bottles at the transfer position and those immediately behind them. In the preferred embodiment, this means comprises the electric motor 11, which according to this invention, is of the reversible gear head type, a movable control member 30, and circuit means 31 governed by the control member for energizing the motor 11 for either forward or reverse operation.

The movement of the control element 30 is synchronized with rotation of the rotor 20, and may comprise a rotatable cam assembly fixed on the transversely extending rotor shaft 33 to rotate therewith, as seen in Figure 1 and as indicated by the construction line 34 in Figures 2, 3 4 and 4a. For convenience, the cam assembly is shown as comprising a large disc 35 having diametrically opposite notches 36 in its periphery, and a smaller disc 37 having diametrically opposite lobes 38 projecting from its periphery.

The circuit means 31 for the reversible electric motor consists of two energizing circuits, a "forward" circuit governed by a switch 40, and a "reverse" circuit governed by a switch 41. The forward switch 40 is mounted alongside the larger disc of the cam assembly and comprises an arm which tracks on the periphery of the cam 35 so that the switch will be maintained closed thereby except for two substantially short intervals, during each revolution of the rotor 20, at which the notches 36 in the cam effect opening of the switch to stop forward operation of the motor. The reversing switch 41 is mounted alongside the smaller cam 37 and likewise comprises an arm which tracks on the periphery of the cam so that the switch will be maintained open thereby except for two momentary intervals, during each revolution of the rotor 20 at which the switch 40 is open, and during which intervals the closure of the switch 41 by the cam lobes effects reverse operation of the electric motor. The cams of the cam assembly are so angularly positioned with respect to one another and to the rotor arms 19, that when one set of arms reaches a position such as shown in Figure 2, just a short time before engagement with the bottoms of the bottles in the transfer position T, the cam 35 effects opening of the forward switch 40 to stop forward operation of the conveyor motor 11. At this time, the reversing switch 41 is also open but is just about to be closed by one of the lobes 38 on the smaller cam, to complete an energizing circuit for the motor causing operation thereof in the reverse direction. In Figure 2, therefore, the conveyor 8 has been halted preliminary to reversing its motor 11, but it will be understood that the rotor 20 and the cam assembly thereon continue to revolve in the counter-clockwise direction since the rotor is driven by the washing machine.

Figure 3 illustrates the condition of the loading apparatus after the rotor has been rotated only far enough from the Figure 2 position to bring its arms 19 into engagement with the bottoms of the bottles in the row 25 thereof at the transfer position. As therein shown, the electric motor 11 has just stopped operating in the reverse direction and the top stretch of the conveyor has been backed up a short distance due to the momentary closure of switch 41 by its cam 37. Since the bottles at the transfer position T are out of transporting relation with the conveyor, such momentary reversal of the con-

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veyor motor effects separation of the bottles on the conveyor from those at the transfer position, and the latter may then be lifted by the rotor arms without interference from the bottles behind them.

Attention is directed to the fact that with the positions of the parts shown in Figure 3, the cam assembly has been rotated to a position at which the reversing switch 41 has just been opened by the cam 37, and at which time the forward switch 40 is still open but is about to be closed by its cam 35 to again start the motor operating in the forward direction. A slight time lag is desirable, of course, before the electric motor is again energized for forward operation, in order to give the rotor arms time to carry the bottles sufficiently far out of the transfer position to assure that they will not be struck by the next successive row of bottles delivered to the transfer position.

After the rotor has advanced to the Figure 4 position to complete the transfer of the bottles to the loading station L, the next successive row of bottles has already been delivered to the transfer position T defined by their engagement with the lower rear ends of the tracks 18; and the motor continues to operate in the forward direction since the forward switch 40 is closed and the reversing switch 41 is open.

The provision of diametrically opposite notches and lobes for the cams is necessitated by the fact that the rotor is provided with diametrically opposite sets of arms 19, by which two successive rows of bottles are lifted out of the transfer position and delivered to the loading station L during each complete revolution of the rotor. The conveyor 5 of the washing machine, of course, advances the rows of bottle carriers 6 past the loading station L at a rate equal to one for each one-half revolution of the rotor 20.

Like the rotor 20, the oscillating pusher 23 which slides the bottles into the pockets 6 of the washer conveyor, is also driven in synchronization with the washer conveyor. The electric motor 11, of course, is separate from the washing apparatus and must drive the loading conveyor 8 at a fast enough rate to assure delivery of the transverse rows of bottles to the transfer position before the sets of arms 19 on the rotor are brought upwardly to the level of the top stretch of the conveyor.

With the foregoing expedient of stopping and reversing the loading conveyor so as to establish a space between the row of bottles at the transfer position and bottles immediately therebehind, it is essential to keep both stretches of the conveyor chains taut at all times. If there were any slack in the lower stretch of the conveyor during normal forward advance thereof, such slack would be transferred to the upper stretch 12 thereof upon reversal of the conveyor motor. To guard against sagging of the top stretch 12 of the conveyor, a pressure shoe 43 is mounted between the upper and lower stretches of the conveyor and has an arcuate segment 44 thereon at all times bearing firmly against the lower stretch of the conveyor to maintain both stretches taut. Friction of the lower stretch of the conveyor against the underside of the segment 44 is minimized due to the fact that this lower stretch and the segment 44 are usually immersed in a shallow pan of soap water (not shown), provided to permit some slippage between the conveyor and the bottoms of the bottles resting on its upper stretch. Obviously, a wheel may be used in place of the shoe 43.

While two separate switches have been shown in Figures 2, 3 and 4 to control forward and reverse operation of the conveyor, Figure 4a shows how a single pole double-throw switch 46 may be used to effect the same purpose in consequence of rotation of a control member 30 comprising a single cam 47 having diametrically opposite lobes thereon. It will be understood, of course, that the switch arm in this case, would be biased upwardly to a position normally closing the forward circuit of the electric motor, as, for instance, by a spring 49.

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The positions of the cam and switch 46 shown in Figure 4a are substantially the same as those of the corresponding parts shown in Figure 4.

In the embodiment of the invention disclosed in Figures 6 through 10, the same objective is achieved as in the foregoing described preferred embodiment of the invention, namely, periodic stopping of the advancing motion of bottles on the conveyor rearwardly of those at the transfer position, and substantially directly thereafter, creation of a space between the bottles at the transfer position and those rearwardly thereof by effecting longitudinal separating motion between them. Previously this space was created by reversing the conveyor to cause rearward motion of the bottles thereon relative to the bottles at the transfer position. However, the conveyor is operated continuously by a non-reversing electric motor of a conventional type in the embodiment of the invention disclosed in Figures 6 through 10, and while means is provided to stop the advancing motion of the bottles on the conveyor, those at the transfer position are moved forwardly relative to the bottles on the conveyor.

The loading apparatus in this case, differs from that previously described mainly by reason of the fact that the transfer position of the bottles, while again defined by the engagement of the foremost bottles with the lower rear portions of the arcuate tracks 18', is located a greater distance forwardly of the front of the conveyor, and the bottles delivered to the transfer position are first caused to pass over a horizontal transversely extending dead plate 51, immediately ahead of the upper stretch of the conveyor and on the same level with it. The dead plate 51 is thus located between the conveyor and the transfer position at which the foremost row of bottles on the loader engage the lower rear ends of the arcuate guide tracks 18'. It will also be noted that the bottles no longer receive any support from the conveyor in their transfer position, and that, instead, the bottles at the transfer position rest on ledges 52 on the lower ends of the guide tracks, to be supported wholly thereby.

The dead plate is supported by a transverse channel 53, being secured to the upper flange of the channel. This channel has its ends secured to the opposite side frames F, and is disposed with its upright back facing away from the loading conveyor, as seen best in Figures 6, 7 and 8. Consequently, the bottles advanced forwardly toward the transfer position are slid across the dead plate 51 to their transfer positions resting upon the ledges 52 of the guide tracks by the weight of the mass of advancing bottles on the conveyor, rather than being directly transported to the transfer position by the conveyor, as was the case in the previous embodiment of the invention. Nevertheless, with the construction described, the bottles at the transfer position would ordinarily be subjected to a substantial amount of pressure created by the force exerted thereon by bottles rearwardly thereof, and which pressure ordinarily results in considerable scuffing and scraping of the bottles, and sometimes even leads to breakage of the bottles.

In the embodiment of the invention disclosed in Figures 6 through 10, a gate 55 extending transversely across the loader immediately ahead of the channel 53 and having a number of sets of upstanding pins 54 thereon corresponding to the number of bottles in the transverse rows handled by the loader, is provided to block the advancing motion of bottles rearwardly of those at the transfer position, while the latter are moved forwardly in order to establish a space between them and the bottles resting upon the dead plate 51. The gate 55 extends entirely across the loader and has its opposite end portions slidably guided for vertical reciprocatory motion between pads 56 secured to the backs of the channels and the inwardly extending flanges of angle irons 57 secured to the opposite side frames of the apparatus. The gate 55 normally occupies a lowered, inoperative position such as illustrated in Figure 6, at which the

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upper ends of the pins 54 thereon lie beneath the plane of the dead plate 51, and the gate, therefore, does not interfere with sliding of the bottles across the dead plate to the transfer position at which they rest upon the ledges 52 of the guide tracks 18'.

The gate is operated, that is raised and lowered, by means of a pair of levers, generally designated 59, one at each side of the apparatus, and each mounted on a stub shaft 60 fixed in the adjacent side frame F. Each lever has a rearwardly extending arm 61, the extremity of which is operatively connected to the gate by means of a ball and socket joint connection 62, and a substantially diametrically opposite forwardly projecting arm 63 which is weighted to counterbalance the gate 55. The arms 63 of these levers extend under the transverse rotor shaft 33 and lie between the side frames and control cams 65 fixed on the rotor shaft near its ends to rotate with the rotor. As indicated in dotted lines in Figures 6, 7 and 8, the control cams have a somewhat oval shaped closed cam track 66 therein opening outwardly to receive a follower 67 on the forwardly projecting arm 63 of the adjacent lever.

From the description thus far, it will be apparent that for each revolution of the rotor to effect the transfer of two successive rows of bottles from transfer to loading positions resting on the upper portions of the guide tracks 18', the lever 59 will be oscillated twice to raise and lower the gate two different times, in synchronization with the rotation of the rotor. With the parts in their positions shown in Figure 6, one set of bottle shifting arms on the rotor has carried a transverse row of bottles out of the transfer position and has nearly completed the delivery thereof to the loading position L on the upper horizontal portions of the guide tracks 18'. The control cam 65 is fixed to the rotor in such angular relationship to its arms that the cam track 66 is, at that time, holding the levers 59 swung to their extreme positions of clockwise oscillatory motion holding the gate 55 in its lower, inoperative position.

Figure 7 illustrates the position of parts after the rotor has revolved approximately one-eighth revolution in the counterclockwise direction from its position seen in Figure 6, and the control cam 65 thereof has advanced far enough to swing the levers 59 in the counterclockwise direction about their stub shafts 60 to thereby partially raise the gate 55 and carry the pins 54 thereon into positions blocking the advance of bottles on the dead plate. In this partially raised position of the gate, each pair of pins 54 thereon straddles the front portion of one of the bottles in the transverse row thereof on the dead plate, as seen best in Figures 9 and 10, to prevent any further motion of these bottles due to the weight of advancing bottles behind them.

After the gate has been partially raised to its position seen in Figure 7, the bottles at the transfer position are moved forwardly relative to those on the dead plate, and this is accomplished by swinging the entire set of arcuate guide tracks 18' in the clockwise direction about the axis of a shaft 69 extending transversely across the loader, substantially directly beneath the upper forward ends of the guide tracks and to which all of them are secured. As shown, the guide tracks 18' are normally maintained in their position seen in Figures 6 and 7 at which the ledges 52 on their lower rear ends are substantially coplanar with the dead plate 51, and this may be achieved by tension springs 70, one on each side of the apparatus, having one end anchored on a pin 71 fixed in the adjacent side frame of the loader, and having its other end connected with the long arm 72 of a bell crank lever to pull upwardly on the same, thereby tending to swing the lever and the transverse shaft 69 to which it is fixed, in the counterclockwise direction. The shorter arm 73 of each of the bell crank levers bears against a stop 74 on the adjacent side frame of the loader to define the

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limit of counterclockwise swinging of the track structure 18' seen in Figures 6 and 7.

Almost directly after the gate 55 has been raised to an operative position such as seen in Figure 7, blocking the forward advance of bottles on the dead plate, the further rotation of the rotor and the control cam thereon in the counterclockwise direction effects full raising of the gate by the counterclockwise swinging movement of the levers 59 in the manner indicated in Figure 8, and it is during this final raising motion of the gate that the entire set of arcuate tracks 18' is swung in the clockwise direction to lower the bottles at the transfer position resting upon the ledges 52 of the tracks, and thus effect the forward motion of such bottles necessary to create a space between them and the bottles resting upon the dead plate 51. Such clockwise swinging of the entire track structure 18' is effected by means of a link 76 connected between the forwardly projecting arm 63 of each of the levers 59 and the long arm 72 of the adjacent bell crank lever on the shaft 69. Attention is directed to the fact that the track structure 18' is caused to remain in its normally raised position during partial raising of the gate to its position shown in Figure 7, despite the counterclockwise motion of the levers 59, by reason of the fact that the links 76 have slotted lost motion connections with the long arms 72 of the bell cranks.

It will be appreciated that the gate is raised and the track structure 18' tilted downwardly and forwardly to the position seen in Figure 8 in such synchronization with the rotation of the rotor that the space between the bottles at the transfer position and those on the dead plate 51 is created just before the next set of bottle shifting arms 19 on the rotor engages the bottoms of the bottles at the transfer position, and that, as soon as the bottles are lifted from the ledges 52 out of the transfer position by the continued rotation of the rotor from its position seen in Figure 8, the control cams 65 will shortly thereafter actuate the levers 59 to return the gate to its lower, inoperative position and simultaneously release the guide track structure 18' for upward swinging motion to its normal position at which it receives the next successive row of bottles from the dead plate 51.

Obviously, the pins 54 on the gate must be long enough so as to prevent forward motion of the bottles on the dead plate during the time the gate is being retracted and until the track structure has been returned to its normal position at which the ledges 52 thereon again aline horizontally with the dead plate.

From the foregoing description taken together with the accompanying drawings, it will be readily apparent that this invention provides an improved loading apparatus by which assurance is had against scuffing and breakage of bottles during the act of lifting the same from their transfer positions toward loading positions at which they may be inserted into the bottle pockets of a washing machine.

What is claimed as our invention is:

1. In bottling handling mechanism of the type wherein bottles in upright positions are moved forwardly along the upper stretch of an endless conveyor and delivered in successive transverse rows to a transfer position at which the transporting relationship between the conveyor and the foremost bottles is disrupted, and which transfer position is defined by the engagement of the bottles in the foremost row with means at the front of the conveyor which obstructs the forward progress of the bottles, and from which transfer position the bottles in said foremost row are transferred to other conveying mechanism by means including a power driven rotor continuously rotating in one direction and having bottle shifting means thereon recurrently rotated through said transfer position to engage the bottoms of the bottles in successive rows thereof delivered to the transfer position to lift them out of said transfer position as a consequence of rotation of the rotor: a reversible electric motor connected

with the conveyor for normally driving the same forwardly; a movable control member constrained to move in synchronization with the rotor; an energizing circuit including switch means for governing normal operation of the motor; another energizing circuit including switch means for governing reverse operation of the motor; means on said control member cooperable with said forward switch means to recurrently effect disruption of said first designated energizing circuit for a period of time extending from shortly before until shortly after engagement of the shifting means on the rotor with the bottoms of each row of bottles delivered to the transfer position; and means on said control member cooperable with said reverse switch means for momentarily effecting completion of said second designated energizing circuit during each such period when forward operation of the motor is disrupted, said reversals of the motor effecting momentary backward travel of the top stretch of the conveyor to create a space between the bottles at the transfer position and bottles immediately behind them, whereby the bottles in the transfer position may be readily moved out of the transfer position without interference from the bottles behind them.

2. In bottle handling mechanism, the combination of: a conveyor for supporting bottles in upright positions and upon which bottles may be moved forwardly and delivered in successive transverse rows to a transfer position at which the transporting relationship between the conveyor and the foremost bottles is disrupted; drive means for said conveyor; means at the front of the conveyor engaged by the foremost row of bottles to obstruct forward progress of the bottles and to define said transfer position; means for transferring bottles at the transfer position to another location, including a shaft driven continuously in one direction from a source of power other than said conveyor drive means, and a rotor fixed on said shaft to rotate therewith and having bottle shifting means thereon recurrently rotated through said transfer position to engage the bottoms of bottles in successive rows thereof delivered to the transfer position and lift them out of said transfer position; rotatable cam means constrained to rotate in synchronization with the rotor; cam operated mechanism recurrently acted upon by said cam means for periodically effecting momentary interruption of the advance of bottles on the conveyor behind those at the transfer position, for an interval beginning shortly before engagement of the shifting means on the rotor with the bottoms of the bottles in each successive row thereof delivered to the transfer position and concluding with passage of the shifting means through the transfer position; and cam operated mechanism recurrently acted upon by said cam means at the beginning of each such interval and before the shifting means on the rotor engages the bottoms of the bottles at the transfer position, for effecting substantially slight separating motion between the row of bottles at the transfer position and the bottles on the conveyor rearwardly thereof, whereby each row of bottles delivered to the transfer position may be lifted by the bottle shifting means on the rotor unhindered by the bottles rearwardly thereof.

3. The bottle handling mechanism of claim 2, further characterized by: the fact that said drive means for the conveyor comprises a reversible electric motor for nor-

mally driving the conveyor forwardly; the provision of an energizing circuit for the motor including switch means for governing normal operation of the motor; the provision of another energizing circuit controlled by said switch means for governing operation of the motor in the reverse direction; and wherein said switch means and the electric motor governed thereby constitute the cam operated mechanism which is recurrently acted upon by said rotatable cam means.

4. The bottle handling mechanism of claim 2, further characterized by: the fact that said drive means for the conveyor comprises an electric motor; the provision of an energizing circuit for the motor including switch means for starting and stopping the motor; and by the fact that said switch means and the electric motor governed thereby constitute the cam operated mechanism which is recurrently acted upon by said rotatable cam means to periodically effect interruption of the advance of bottles on the conveyor behind those at the transfer position.

5. The bottle handling mechanism of claim 2, further characterized by: the fact that said cam operated mechanism for effecting momentary periodic interruption of the advance of bottles on the conveyor behind those at the transfer position comprises movable gate means which is actuated by the cam means from a normally inoperative lowered position beneath the bottle supporting surface of the conveyor to an operative elevated position to block the advance of bottles on the conveyor behind those at the transfer position.

6. The bottle handling mechanism of claim 2, further characterized by: the fact that said obstructing means has ledges thereon onto which the foremost bottles are advanced by the conveyor to support the foremost row of bottles at the transfer position; the fact that said obstructing means is mounted for back and forth movement between a normal position at which the bottle supporting ledges thereon are in transfer relation to the front of the conveyor and another position at which bottles on the ledges are spaced forwardly from the bottles rearwardly thereof; and wherein said movable obstructing means and its ledges comprise the cam operated mechanism for effecting substantially slight separating motion between the row of bottles at the transfer position and the bottles on the conveyor rearwardly thereof.

7. The bottle handling mechanism of claim 6, further characterized by: the fact that said cam operated mechanism for effecting momentary periodic interruption of the advance of bottles on the conveyor behind those at the transfer position comprises movable gate means which is actuated by the cam means from a normally inoperative lowered position beneath the bottle supporting surface of the conveyor to an operative elevated position to block the advance of bottles on the conveyor behind those at the transfer position.

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