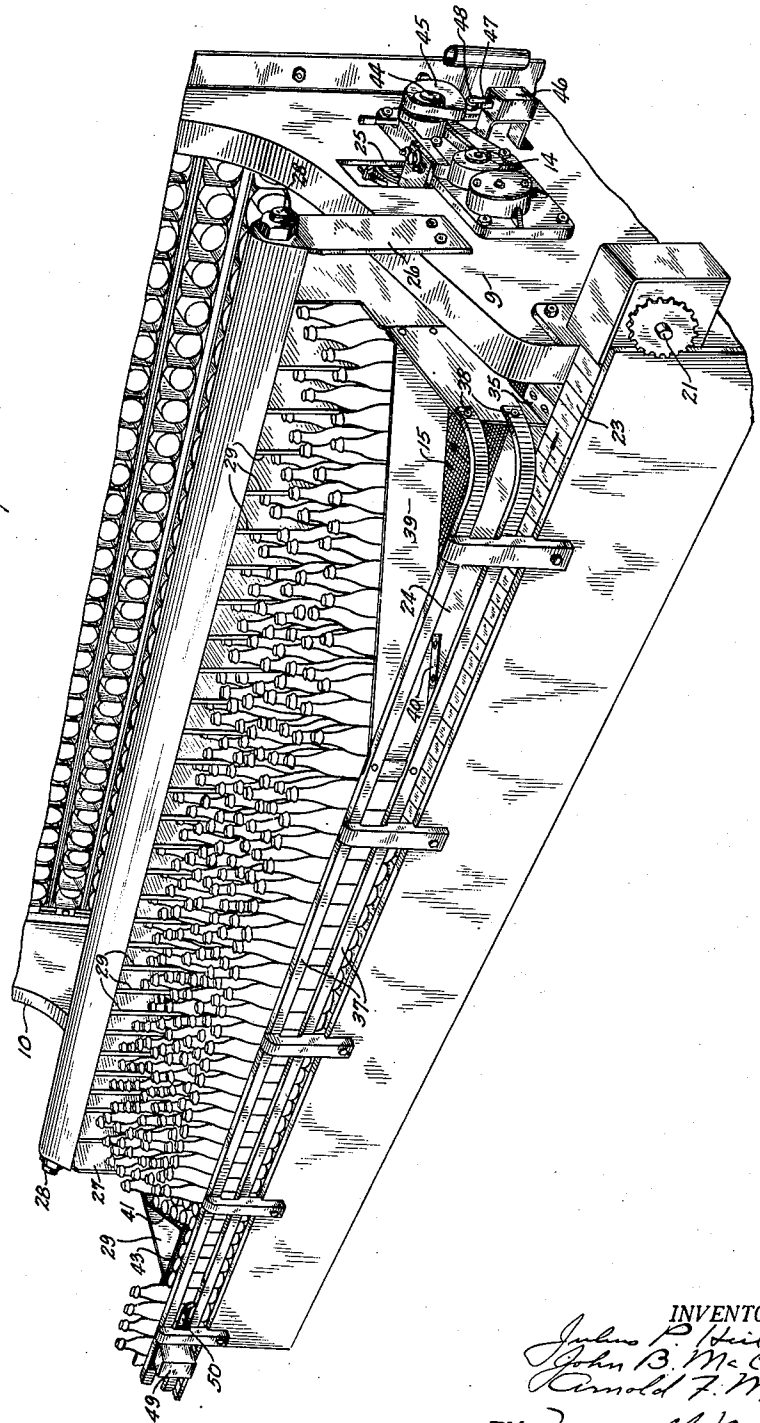
Aug. 3, 1954 J. P. HEIL ET AL 2,685,358

LOADING DEVICE FOR BOTTLE WASHERS

Filed Feb. 12, 1949 5 Sheets-Sheet 1

Fig. 1.



INVENTORS
John P. Heil
John B. McCabe
Arnold F. Meyer
BY Mosulle & Mosulle
ATTORNEYS.

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LOADING DEVICE FOR BOTTLE WASHERS

Filed Feb. 12, 1949 5 Sheets-Sheet 2

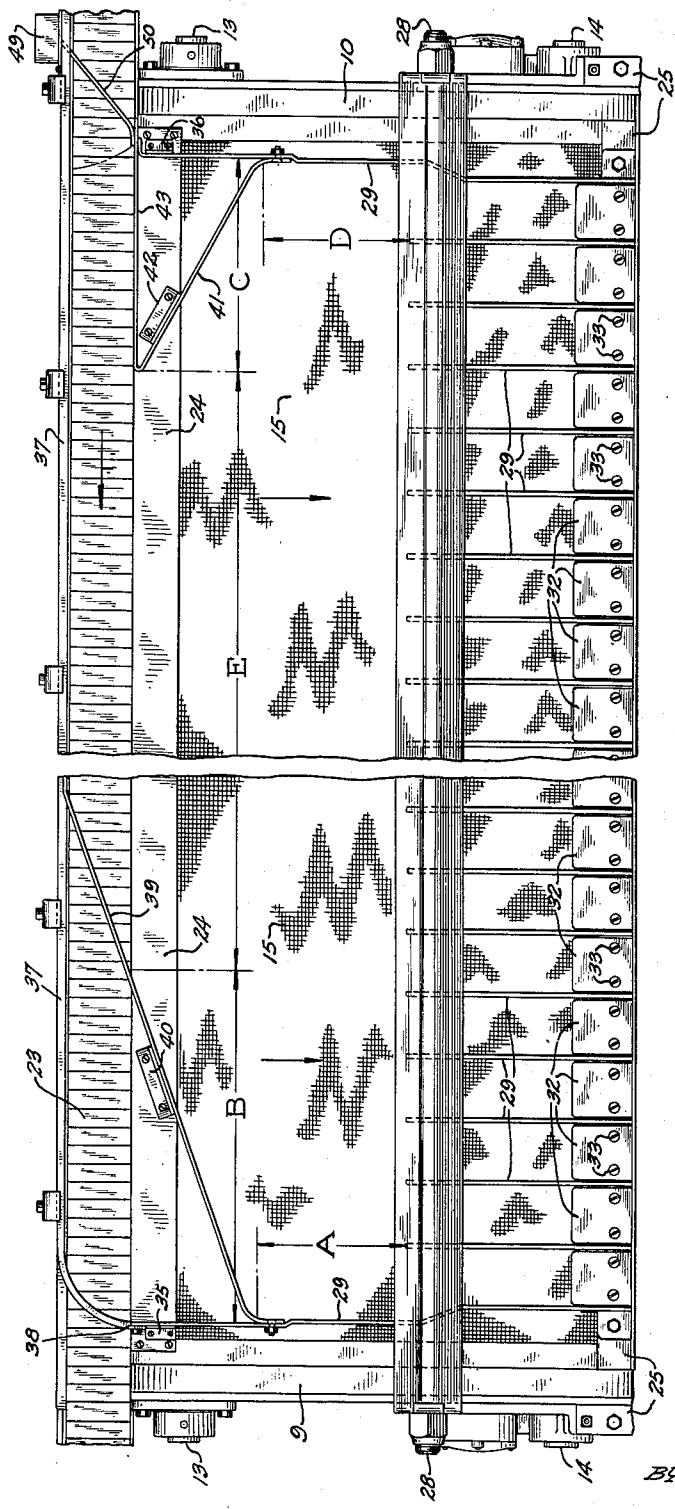

Fig. 2.

INVENTORS
Julius P. Heil
John B. McCabe
Arnold F. Meyer
BY Mirault & Mirault
ATTORNEYS.

Aug. 3, 1954 J. P. HEIL ET AL 2,685,358

LOADING DEVICE FOR BOTTLE WASHERS

Filed Feb. 12, 1949 5 Sheets-Sheet 3

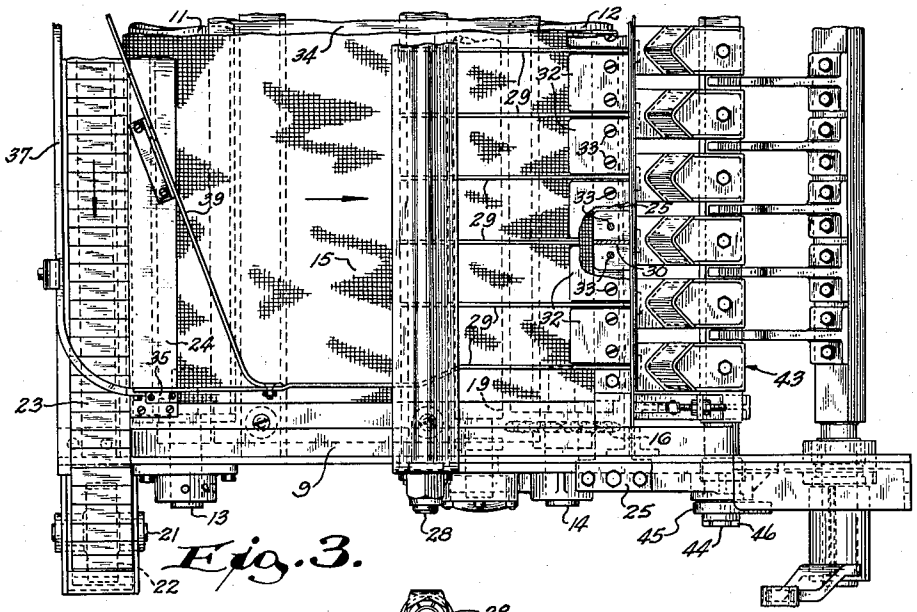

Fig. 3.

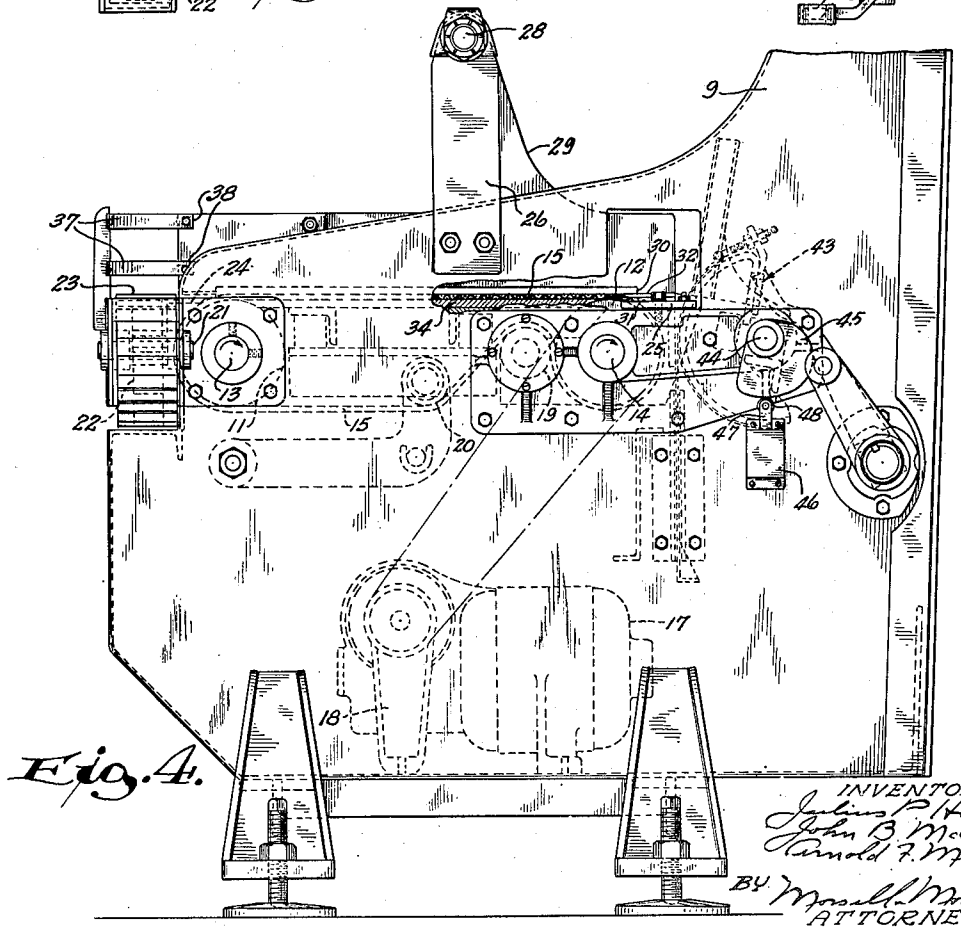

Fig. 4.

INVENTORS
Julius P. Heil
John B. McCabe
Arnold F. Meyer
BY Mould & Mould
ATTORNEYS.

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LOADING DEVICE FOR BOTTLE WASHERS

Filed Feb. 12, 1948 5 Sheets-Sheet 4

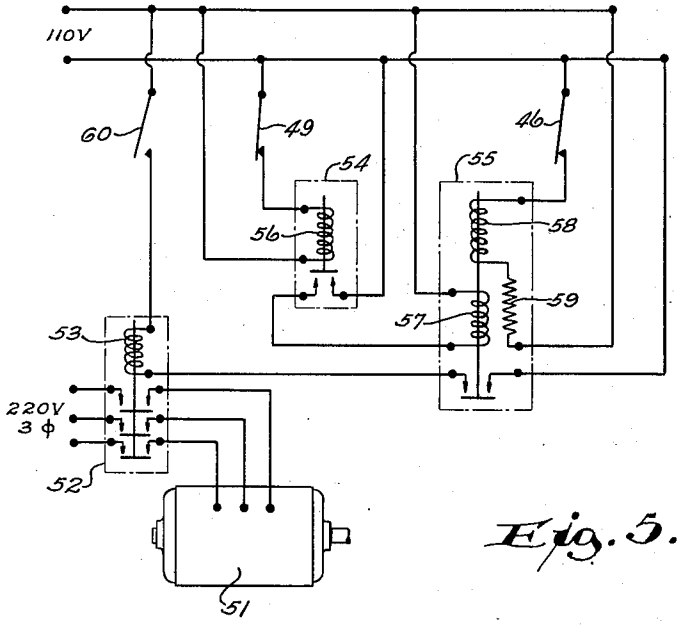

Fig. 5.

INVENTORS
John P. Heil
John B. McCabe
Arnold F. Meyer
BY Morsell & Morsell
ATTORNEYS.

Aug. 3, 1954 J. P. HEIL ET AL 2,685,358

LOADING DEVICE FOR BOTTLE WASHERS

Filed Feb. 12, 1949 5 Sheets-Sheet 5

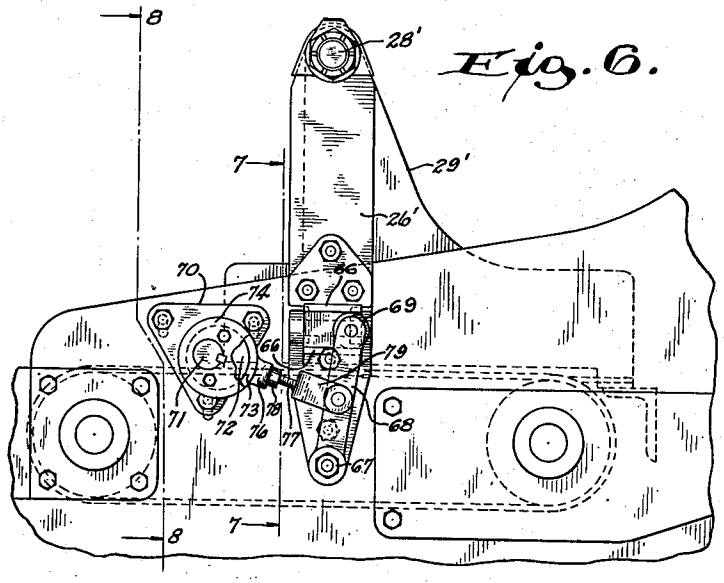

Fig. 6.

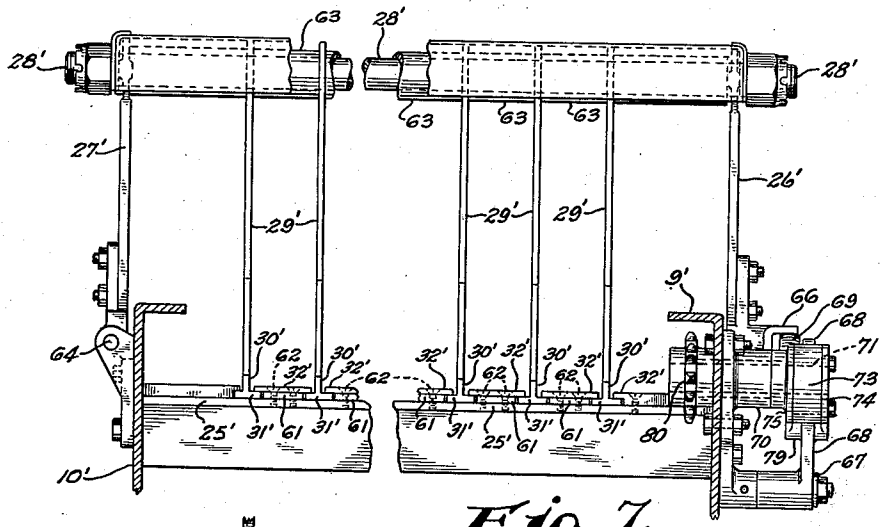

Fig. 7.

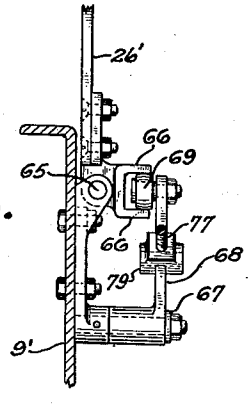

Fig. 8.

INVENTORS
Julius P. Heil
John B. McCabe
Arnold F. Meyer
BY Mynall & Mynall
ATTORNEYS.

Patented Aug. 3, 1954

2,685,358

UNITED STATES PATENT OFFICE

2,685,358

LOADING DEVICE FOR BOTTLE WASHERS

Julius P. Heil and John B. McCabe, Milwaukee, and Arnold F. Meyer, Pewaukee, Wis., assignors, by mesne assignments, to Cherry-Burrell Corporation, Chicago, Ill., a corporation of Delaware

Application February 12, 1949, Serial No. 76,012

10 Claims. (Cl. 198—30)

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This invention relates to improvements in loading devices for bottle washers or the like.

In bottle washing machines heretofore available it has been standard practice to load by hand. This has been done by lifting the bottles to be washed from cases placed at the front of the machine and by placing said bottles on the main table conveyor of the machine. The main table conveyor serves to move the bottles inwardly, in an upright position, toward the tilting mechanism and the latter serves to feed the bottles into the bottle carrier pockets. In order to insure feeding of the bottles into the tilting mechanism in a proper transversely spaced relationship it has heretofore been common practice to use transversely spaced guide plates which project outwardly from the tilting mechanism and between which the bottles are adapted to be moved by the main table conveyor.

In conventional machines, as the bottles are being moved inwardly by the main table conveyor there is a tendency for said bottles to arch or bridge across in front of the guide plates to cause a jam. This, of course, results in interruption of the feed to the machine.

It is a general object of the invention to provide an improved loader for bottle washers or the like which is adapted for use in delivering bottles from an automatic case unloader located remotely from the bottle washer and which eliminates the manual loading operation.

A further object of the invention is to provide an improved loader for bottle washers which is so constructed that jamming of the bottles on the main table conveyor is prevented.

A further object of the invention is to provide a loader as above described wherein there is a feed conveyor for delivering bottles in single file from a remote point, said feed conveyor being arranged to discharge said bottles onto the main table conveyor in random fashion, and there being means for causing proper distribution of said bottles on the main table conveyor to provide for proper delivery between all of the guide plates.

A further object of the invention is to provide an apparatus of the class described having means responsive to a break in the continuity of the feed of bottles on the feed conveyor for controlling the operation of the bottle washer.

A further, more specific object of the invention is to provide an apparatus of the class described wherein the means for controlling the operation of the washer includes a circuit having a first switch actuated by an arm placed in the path of

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the bottles on the feed conveyor and also includes a time delay relay which actuates a second switch after said first switch has been closed a predetermined length of time due to a break of predetermined length in the line of bottles on the feed conveyor.

A further object of the invention is to provide apparatus of the class described wherein the control circuit includes means for maintaining the power supply to the washer drive motor unbroken after said time delay relay switch has been opened and until the bottle tilting mechanism of the washer assumes a predetermined position.

A further, more specific object of the invention is to provide a device of the class described having a pair of diverging guide or baffle plates positioned over opposite corner portions of the main table conveyor to provide restricted access from the feed conveyor to said main table conveyor whereby jamming of the bottles in front of the divider plates is prevented.

A further specific object of the invention is to provide in a device of the class described additional means whereby jamming of the bottles in front of the divider plates may be prevented by having means for causing limited swinging or vibrating movement of the divider plates.

A further object of the invention is to provide an improved bottle loading mechanism which is strong and durable, efficient in operation, and otherwise well adapted for the purposes described.

With the above and other objects in view, the invention consists of the improved loading device for bottle washers, and all of its parts and combinations, as set forth in the claims, and all equivalents thereof.

In the drawings accompanying and forming a part of this specification, wherein are shown two embodiments of the invention, and wherein the same reference characters indicate the same parts in all of the views:

Fig. 1 is a fragmentary perspective front view of the preferred form of the improved bottle loading mechanism showing it associated with a bottle washing machine, and showing bottles being handled thereby, certain of the bottles being broken away to better show the construction of the machine;

Fig. 2 is a fragmentary plan view of the improved bottle loading machine;

Fig. 3 is a plan view of a portion of the improved machine also showing a portion of the bottle tilting mechanism;

Fig. 4 is a side view of the improved bottle loading machine and bottle tilting mechanism;

Fig. 5 is a wiring diagram of the electrical control circuit;

Fig. 6 is a fragmentary side view showing an additional means for preventing jamming;

Fig. 7 is a vertical sectional view taken approximately on the line 7—7 of Fig. 6; and

Fig. 8 is a vertical sectional view taken approximately on the line 8—8 of Fig. 6.

Referring more particularly to Figs. 1, 2 and 3 of the drawings, the numerals 9 and 10 indicate a pair of spaced, parallel, vertically extending frame members which are adapted to be operatively connected to corresponding frame members on the front end of a conventional bottle washing machine. The members 9 and 10 are suitably connected to provide the proper support and to maintain their proper respective positions. A pair of spaced, horizontally extending, parallel rollers 11 and 12 are fixed respectively to a pair of shafts 13 and 14, the ends of which are suitably journalled in the frame members 9 and 10.

Extending around the rollers 11 and 12 is an endless main table conveyor 15 which may be made of wire mesh or any other suitable flexible material. The conveyor 15 extends substantially the entire distance between the frame members 9 and 10. Between the rollers 11 and 12 the upper extent of the conveyor 15 travels across a suitable supporting table 34, as shown in Fig. 4. The shaft 14 is provided with a sprocket 16 (see Figs. 3 and 4) which may be connected to a suitable source of power such as an electric motor 17, the latter being provided with a suitable gear reduction unit 18. The motor 17 drives the conveyor 15 in the direction indicated in Figs. 1, 2, 3 and 4. Suitable idler rollers, such as the axially fixed roller 19 (see Fig. 4) and the axially movable roller 20 may be provided to maintain the desired tension on the conveyor 15.

Journalled at the front end of the frame member 9 on an axis which is in substantially the same horizontal plane as, but at right angles to the shaft 13 is a short shaft 21. The shaft 21 has a sprocket 22 fixed thereto, around which a relatively narrow conveyor belt 23 extends. The conveyor belt 23 is preferably made of metal and extends transversely of the machine and beyond the frame member 10 to a remote loading point. The conveyor 23 is driven in the direction indicated by any suitable means. From the drawings it is apparent that the upper extent of the conveyor 23 is adjacent the upper extent of the conveyor 15 and in substantially the same plane.

Extending transversely between the frame members 9 and 10 is an elongated horizontal plate 24. The plate 24 is supported with one edge portion engaging the underside of the conveyor 23 and with the other edge positioned adjacent the conveyor 15 and slightly forwardly of the axis of the roller 11. The plate 24 may form part of an angle member as shown in Fig. 4.

Extending transversely between the frame members 9 and 10 and fixed at its ends thereto is a horizontal elongated plate 25. The plate 25 is positioned adjacent the forward end of the upper extent of the conveyor 15 with the upper surface of said plate slightly below the plane of the upper surface of the conveyor 15.

Spaced above the conveyor 15 and supported at each end by the frame members 9 and 10 through suitable brackets 26 and 27 is a transversely extending horizontal shaft 28. A plurality of equally spaced vertical divider plates 29 are positioned above the rear end portion of the upper extent of the conveyor 15. The divider

plates are spaced apart a distance slightly greater than the outer diameter of the bottles to be handled by the machine. The divider plates 29 are substantially L-shaped in outline, as shown in Fig. 4, with upper portions apertured to receive the shaft 28. At their rear edges the divider plates 29 are formed with downwardly extending portions 30 which terminate in an inverted T-shaped flange 31 (see Fig. 4). The flanges 31 all rest on the upper surface of the plate 25. Positioned on top of the flanges 31 and extending horizontally forwardly between the divider plates 29 toward the conveyor 15 are rectangular plates 32. The plates 32 and the flanges 31 are fixed to the plate 25 by screws 33 extending therethrough. The plates 32 are positioned with their upper surfaces in substantially the same plane as the upper surface of the conveyor 15 as shown in Fig. 4.

The outermost divider plate 29, on each side of the machine, is elongated and extends forwardly to the plate 24, on which the forward ends of said elongated portions are supported as at 35 and 36 (see Fig. 2). A suitable guide rail 37 is mounted along the outer edge of the feed conveyor 23, and said guide rail curves inwardly across the conveyor 23 to connect with the forward end of the elongated divider plate adjacent the frame member 9 as at 38.

Fixed at one end to the elongated divider plate 29 which is adjacent the frame member 9, at a point intermediate the length of said divider plate, and fixed at the other end to the guide rail 37, is a vertical baffle plate 39 which extends diagonally over the upper extent of the conveyor 15, over the plate 24 and over the feed conveyor 23, as is clearly shown in Figs. 1, 2 and 3. The plate 39 may be supported intermediate its length on the plate 24, as at 40.

A second vertical baffle member includes an oblique part 41 which is connected at one end to the elongated outermost divider plate which is adjacent the frame member 10 at a point intermediate the length of said divider plate. The baffle part 41 extends forwardly and inwardly over the conveyor 15 toward the feed conveyor, and may be fixed adjacent its innermost portion to the plate 24 as at 42. The baffle member includes a portion 43 extending outwardly longitudinally of the inner edge of the feed conveyor 23 as is clearly shown in Fig. 2, and the portion 43 serves as a guide rail in the same manner as the guide rail 37 on the opposite side of the feed conveyor 23.

The disposition and length of the plates 39 and 41 may be varied for machines of various sizes in accordance with requirements. Experience has shown that satisfactory operation results when the dimensions A and D (see Fig. 2) are approximately equal to three times the outer diameter of the bottles which the machine is designed to handle. The distance B in such a case may be approximately equal to five or six diameters, whereas the distance C may be approximately equal to three diameters.

Referring to Figs. 3 and 4 it will be noted that the improved bottle loading machine is incorporated in a single unit with a bottle tilting mechanism 43. Since the bottle tilting mechanism does not form a part of this invention, it will not be described in detail. It should be mentioned, however, that the tilting mechanism 43 is fixed to a shaft 44 which is suitably journalled at its ends in the frame members 9 and 10. The shaft 44 is suitably driven by the main drive motor of the

bottle washing machine and is rotated from its normal position through an angle of about 90° in a clockwise direction, as viewed in Fig. 4, and is then returned to its normal position by reverse rotation.

Fixed to the end of the shaft **44** which projects outwardly from the frame member **9** is a cam **45**. Mounted on the outside of the frame member **9** below the cam **45** is an electrical switch **46**. The switch **46** has an upwardly projecting spring loaded cam following arm **47** which terminates in a roller **48**. The roller **48** is maintained in contact with the edge surface of the cam. The switch **46** has a pair of contacts which are closed when the tilting mechanism **43** and the cam **45** are in the positions shown in Figs. 1, 3 and 4, which is the position assumed by the parts before tilting of bottles takes place. However, when the tilting mechanism is rotated 90° in a clockwise direction the shape of the cam **45** permits the cam following arm **47** to move upwardly to cause the contacts of the switch **46** to open. The purpose of this will become apparent as the description progresses.

Referring to Figs. 1 and 2, an electrical switch **49** is mounted on the front of the guide rail **37** adjacent the frame member **10**. The switch **49** is provided with an arm **50** which is mounted for pivotal movement in a horizontal plane. The arm **50** is spring urged toward the position of Fig. 2 and may be moved by bottles, as indicated by the dot and dash lines of Fig. 2, to the retracted position of Fig. 1 wherein it is out of the path of the bottles. The switch **49** has a pair of contacts which are open when the arm **50** is in retracted position and are closed when said arm is swung to the position of Fig. 2.

The electrical circuit

Fig. 5 shows an electrical control circuit which regulates the operation of the main drive motor **51** of the bottle washing machine, the latter being operated in conjunction with the improved bottle loading mechanism. A normally open triple pole, solenoid operated switch **52** connects the motor **51** with a source of 220 volt 3 phase electric current. The switch **52** has a solenoid coil **53**. The electrical control circuit also includes normally closed solenoid actuated time delay switch **54**, and a normally open solenoid actuated switch **55**. The switch **54** has a solenoid coil **56**, and the switch **55** has a pair of solenoid coils **57** and **58**. Connected in series with the coil **58** is a resistance **59**. The resistance **59** reduces the strength of the coil **58** to a point wherein it is not strong enough to close the contacts of the switch **55**, but it is strong enough to hold said contacts closed once they have been drawn closed by the coil **57**.

A manually operated switch **60** is connected to one side of a source of 110 volt electric current and is connected in series with the solenoid coil **53** and with the contacts of the switch **55** to the other side of the 110 volt source, as shown in Fig. 5. The solenoid coil **56** and the switch **49** are connected in series and are connected across the 110 volt source. The solenoid coil **57** and the contacts of the switch **54** are connected in series and are likewise connected across the 110 volt source. Similarly, the switch **46** and the solenoid coil **58** with the resistance **59**, are connected in series and are connected across the 110 volt source, as shown in Fig. 5.

Operation

In describing the operation of the improved bottle loading machine it will be assumed that the bottle tilting mechanism and the cam **45** are in the position shown in Figs. 1, 3 and 4, and that at the start there are no bottles on either the feed conveyor **23** or the main table conveyor **15**. With the parts so arranged, the switches **46** and **49** are closed and the switches **54** and **55** are open. Movement of the feed conveyor **23** and the main table conveyor **15** is started in the direction indicated in the drawings.

Bottles which are loaded onto the feed conveyor **23** at the remote loading point, either manually or by automatic case unloaders, are conveyed toward the main table conveyor **15**. As the bottles pass the switch **49** they swing the arm **50** to its retracted position of Fig. 1 and open the contacts of said switch. This in turn deenergizes the coil **56** and closes the contacts of the time delay relay switch **54**. Closing of the contacts of the switch **54** energizes the coil **57** of the switch **55**, and this coil then pulls the contacts of the switch **55** closed to prepare the circuit for operation when the switch **60** is thereafter closed manually.

After the bottles have passed the arm **50** they thereafter slidingly engage the obliquely extending vertical plate **39** and are squeezed off of said conveyor into the plate **24**. Bottles following behind on the conveyor **23** push the bottles ahead of them off of the plate **24** and onto the main table conveyor **15**. Some of the bottles move off the conveyor **23** before reaching the plate **39**. Bottles are thus crowded off of the conveyor **23** and onto the conveyor **15** automatically. The bottles then move rearwardly on the conveyor **15** which provides a table area on which the bottles can move at random to occupy the full width of the conveyor **15** as they move toward the divider plates **29**. Upon reaching the divider plates **29**, the bottles move therebetween and are guided by said plates in straight lines toward the bottle tilting mechanism **43**. Bottles continue to crowd onto the main table conveyor, and since no bottles are being handled by the bottle tilting mechanism because it is not yet operating, the main table conveyor fills up as shown in Fig. 1. Whenever bottles are prevented from moving along either of the conveyors **23** or **15** the conveyor continues to move and slides under said bottles.

Due to the fact that the disposition of the plates **39** and **41** provides only a restricted space, as indicated by the letter E in Fig. 2, through which bottles may move onto the plate **24** and onto the conveyor **15**, and also due to the angularity of the plates **39** and **41** with respect to the movement of the conveyors **23** and **15**, the bottles will be moved inwardly along the conveyor **15**, and will move between the divider plates **29** without jamming or bridging across the front edges of any of said divider plates. This free movement of the bottles is of very great importance to the operation of the improved bottle loading machine and has heretofore not been obtained.

The obliquely extending baffle **41**, together with its guide rail portion **43**, prevents bottles from leaving the feed conveyor until after they have passed the inner end of the guide rail **43**. From that point on bottles will move off of the feed conveyor to crowd bottles which are already on the plate **24** onto the main table conveyor **15**. In order to keep the transverse space indicated by C (Fig. 2) filled with bottles, bottles must be constantly crowded into this space. This sidewise movement relieves the back pressure on the bottles which are on other portions of the main

table conveyor. This permits a lateral shifting of all the bottles to enable them to find their places between the divider plates. Thus jamming is effectively prevented. The oblique angle of the baffle 41 tends to direct bottles which are being moved into the space C in a proper direction to fill the spaces between the divider plates on this side of the machine. In addition to the above, the length, angular disposition, and arrangement of the baffle 39 cooperates with the rest of the structure in providing a proper feeding of the bottles and in preventing jamming.

As soon as any bottles have moved the full length of the spaces between divider plates, and into the bottle tilting mechanism 43, the manually controlled switch 60 should be closed. This energizes the coil 53 of the main bottle washing machine motor switch 52 and causes said coil to close the contacts of said switch. This causes the bottle washing machine and the bottle tilting mechanism 43 to begin to operate. After the bottle tilting mechanism 43 has rotated 90° in a clockwise direction to deliver a row of bottles to the bottle washing machine, and after it has returned to the position shown in Fig. 4, another row of bottles moves from between the divider plates 29 onto the bottle tilting mechanism 43.

The feed conveyor 23 is moved at a speed which would deliver more bottles per unit of time than the bottle tilting mechanism 43 can remove from the conveyor 15. It is therefore apparent that the bottles on the conveyor 15 are urged toward the divider plates 29 not only by the conveyor 15, but also by the pressure of other bottles on the conveyor 23. Normally, then, there is a slipping contact between the conveyor 23 and the bottoms of the bottles thereon.

If, for any reason the supply of bottles being fed along the conveyor 23 is interrupted and if the portion of the conveyor 23 adjacent the switch 49 becomes empty of bottles, the arm 50 will swing to its position shown in Fig. 2. This closes the contacts of the switch 49 but no further action takes place immediately. After a predetermined length of time such as, for example, 30 seconds, the contacts of the time delay relay switch 54 are opened due to the energization of the solenoid coil 56. Opening of the contacts of the switch 54 causes deenergization of the solenoid coil 57 of the switch 55. If, at the instant of the opening of the switch 54, the bottle tilting mechanism 43 is in the position shown in Figs. 3 and 4, the contacts of the switch 46 are closed and the coil 58 is energized. The coil 58, when energized, has sufficient strength to hold the contacts of the switch 55 closed. Therefore, the bottle tilting mechanism will continue to operate, and upon said bottle tilting mechanism being rotated 90° from the position shown in Fig. 4 the contacts of the switch 46 will be opened as previously described. Opening of the contacts of the switch 46 causes deenergization of the coil 58 and opens the contacts of the switch 55. This deenergizes the coil 53 of the switch 52 and opens the contacts of said switch, thereby shutting off the power to the motor 51 and stopping the operation of the bottle washing machine and of the bottle tilting mechanism 43.

The time delay relay switch 54 is placed in the electrical control circuit in order that the operation of the bottle washer be stopped only if there is an appreciable break in the continuity of the bottles being fed to the improved bottle loading machine by the feed conveyor 23. The length of time delay in the switch 54 may be adjusted to suit requirements.

Upon resumption of feed of the bottles by the conveyor 23, the bottles will move the arm 50 of the switch 49 to its retracted position shown in Fig. 1 to open the contacts of said switch. This deenergizes the solenoid coil 56 and closes the contacts of the switch 54. Closing of the contacts of the switch 54 energizes the solenoid coil 57 of the switch 55, closing the contacts of said switch, and causing energization of the solenoid coil 53 of the switch 52. Energization of the solenoid coil 53 in turn, closes the contacts of the switch 52, and again starts the bottle washing machine and the bottle tilting mechanism 43 in operation in response to operation of the motor 51.

Construction of Figs. 6, 7, and 8

Figs. 6, 7 and 8 disclose a method of preventing jamming or bridging of the bottles in front of the divider plates 29 which may be used alternatively to or in conjunction with the structure of Fig. 2. This is accomplished by pivotally mounting said divider plates at their rear ends, and by vibrating the forward ends of said plates back and forth in a horizontal direction. Referring to Fig. 7, it will be noted that the T-shaped flange portions 31' of the divider plates 29' are substantially narrower than the portions 31 of the principal form. The divider plates 29' rest on the transverse plate 25' as shown in Fig. 7. Between each of the portions 31' on the plate 25' is a spacer 61. Plates 32' are positioned over the spacers 61 and are fixed in position by screws 62 which extend through the spacers 61 and into the plate 25'. The plates 32' overlap the portions 31' of the divider plates 29' with a sliding engagement.

At their upper ends the divider plates 29' are apertured to receive a shaft 28'. Positioned on the shaft 28' between the divider plates 29' are suitable spacing sleeves 63. The shaft 28' is supported at its end by arms 26' and 27'. The arm 27' is pivotally mounted on the main frame member 10', as at 64, for swinging movement in a vertical plane. The connection of the upper end of the arm 27' with the shaft 28' is of the type which permits slight swinging movement of the arm 27' relative to the shaft 28'. The arm 26' is pivotally supported at its lower end on the main frame member 9' as at 65 (see Fig. 8), and at its upper end is connected to the shaft 28' in the same manner as in the arm 27'.

The arm 26' is provided adjacent the connection 65 with a pair of outwardly projecting spaced parallel flanges 66. Pivotally mounted on the frame member 9' below the arm 26', as at 67, is an arm 68 which is swingable in a vertical plane. At its upper end the arm 68 rotatably carries a roller 69 which is positioned between the flanges 66, as shown in Fig. 8.

A flanged bearing 70 is mounted on the outside of the frame member 9' forwardly of the arm 26'. Journalled in the bearing 70 is a transverse shaft 71 which extends outwardly from the bearing 70, and which also extends through the frame member 9' as shown in Fig. 7. Fixed to the outer end of the shaft 71 is an eccentric cam member 72 which is slidably encircled by an annular cam follower 73. The cam follower 73 is held against axial movement by a pair of plates 74 and 75 fixed to the cam 72 on opposite sides of the follower 73. The follower 73 is formed with a radially projecting

boss 76 which is threaded to receive an adjustable bolt 77 having a lock nut 78 thereon. The bolt 77 is bifurcated at its opposite end as at 79 and said end is pivotally connected to the lever 68 intermediate the length of said lever, as shown in Fig. 6. Fixed to the end of the shaft 71 inwardly of the frame member 9' is a sprocket 80 which may be connected to any suitable source of power by means of a chain (not shown).

Operation of structure of Figs. 6, 7 and 8

In operation, rotation of the sprocket 80 causes rotation of the shaft 71 and of the eccentric cam 72. This imparts a substantially reciprocatory motion to the bolt 77 which, in turn, causes the arm or lever 68 to swing back and forth on the pivot 67. This movement of the lever 68 causes the roller 69 to alternately raise and lower the flanges 66 as said roller travels in its arcuate swinging path. Since the lower end of the arm 26' and its pivotal mounting are substantially a bell crank lever arrangement, raising and lowering of the flanges 66 will impart a substantial horizontal reciprocatory movement to the upper end of the arm 26' and, in turn, to the shaft 28'. Horizontally reciprocatory movement of the shaft 28' imparts a like movement to the forward ends of the divider plates 29'. Since the divider plates 29' are not rigidly mounted on the plate 25', reciprocation of the forward portions of said plates becomes a swinging movement in a horizontal plane about their rear ends. Normally, this swinging movement is limited in extent and may, if desired, be limited to a horizontal vibrating movement.

By reason of the continual horizontal reciprocatory movement of the forward edges of the divider plates 29', bottles are prevented from jamming or bridging across in front of said divider plates. It is, of course, intended that the control switch feature heretofore described be used in the improved loader in conjunction with the vibratory divider plates.

It is apparent that by providing a means for preventing the jamming of bottles in front of the divider plates, a bottle loading machine of high efficiency is made possible, wherein the bottles move smoothly toward and between the divider plates and into the bottle tilting mechanism. By providing an electrical control circuit which is responsive to the continuity of the feed of bottles on the conveyor 23, the bottle tilting mechanism and the bottle washing machine are prevented from operating when no bottles are being supplied by the conveyor 23. This prevents loss of efficiency or trouble. By reason of the cam 45 and the switch 46 the bottle washing machine and the bottle tilting mechanism are kept running until the bottle tilting mechanism is rotated to a position 90° clockwise from that shown in Figs. 3 and 4. When the tilting mechanism is in this rotated position, there is no tendency for bottles to be tipped off of the plates 32. The bottles on the plates 32 are thereby kept upright at all times.

Various changes and modifications may be made without departing from the spirit of the invention, and all of such changes are contemplated as will come within the scope of the claims.

What we claim is:

1. In a loader for bottle washing machines or the like, a relatively wide main conveyor, a feed conveyor movable from a remote location to said main conveyor and having a bottle transferring section extending transversely of the main conveyor in a position to transfer bottles to said main conveyor, said bottle transferring section having a length sufficient to permit transfer of a plurality of bottles simultaneously, said main conveyor being movable in a direction away from said bottle transferring section of the feed conveyor, a plurality of transversely spaced longitudinally extending divider plates positioned over a portion of the main conveyor and toward which said main conveyor moves, said divider plates having outer edges spaced from said bottle transferring part of the feed conveyor to provide a table area on said main conveyor on which bottles diverted from said feed conveyor may move at random before reaching said divider plates, baffling means positioned to prevent bottles from leaving the feed conveyor until after they have travelled transversely inwardly a substantial distance relative to the width of the main conveyor and additional baffling means defining the inner end of said bottle transferring section and overlapping said main and feed conveyors for diverting bottles from said bottle transferring section laterally toward said main conveyor, said additional baffling means being positioned for engagement by bottles on both the feed conveyor and the main conveyor.

2. In a loader for bottle washing machines or the like, a relatively wide main conveyor, a feed conveyor movable from a remote location to said main conveyor and having a bottle transferring section intermediate the width and extending transversely of the main conveyor in a position to transfer bottles to said main conveyor, said main conveyor being movable in a direction away from said bottle transferring section of the feed conveyor, a plurality of transversely spaced longitudinally extending vertically swinging divider plates positioned over a portion of the main conveyor and toward which said main conveyor moves, said divider plates having outer ends spaced from said bottle transferring part of the feed conveyor to provide a table area on said main conveyor on which bottles diverted from said feed conveyor may move at random before reaching said divider plates, and bottle guiding means positioned over said main conveyor and extending obliquely toward that side of the main conveyor at which the feed conveyor enters, said guiding means being positioned for engagement by bottles on the table area of said main conveyor.

3. In a loader for bottle washing machines or the like, a relatively wide main conveyor for delivering bottles to the bottle washing machine; means for removing bottles from the main conveyor; a feed conveyor movable transversely adjacent said main conveyor for delivering bottles thereto, said main conveyor being movable in a direction away from said feed conveyor; a plurality of horizontally spaced vertical divider plates positioned over a portion of the main conveyor and toward which the main conveyor moves, said divider plates having forward edges spaced from said feed conveyor to provide a table area on said main conveyor on which bottles delivered by said feed conveyor may move at random before reaching the divider plates; and a pair of spaced baffle plates positioned over the main conveyor and extending from points intermediate the width of the main conveyor and adjacent the feed conveyor in diverging relationship toward the divider plates and toward the outer edges of the main conveyor, one of said baffle plates having a portion extending over the feed conveyor to divert bottles therefrom onto the main conveyor between

said baffle plates, said feed conveyor having a delivery rate greater than the rate of removal of bottles from the main conveyor; and both of said conveyors being constructed of material which permits slipping engagement of said conveyors with the bottles thereon when said bottles are prevented from moving therewith.

4. In a loader for bottle washing machines or the like, a relatively wide main conveyor for delivering bottles to the bottle washing machine; means for removing bottles from the main conveyor; a feed conveyor movable transversely adjacent said main conveyor for delivering bottles thereto, said main conveyor being movable in a direction away from said feed conveyor; a plurality of horizontally spaced vertical divider plates positioned over a portion of the main conveyor and toward which the main conveyor moves, said divider plates having forward edges spaced from said feed conveyor to provide a table area on said main conveyor on which bottles delivered by said feed conveyor may move at random before reaching the divider plates; and a pair of spaced baffle plates positioned over the main conveyor and extending from points intermediate the width of the main conveyor and adjacent the feed conveyor in diverging relationship toward the divider plates and toward the outer edges of the main conveyor, at least one of said plates being straight, and one of said baffle plates having a portion extending over the feed conveyor to divert bottles therefrom onto the main conveyor between said baffle plates, said feed conveyor having a delivery rate greater than the rate of removal of bottles from the main conveyor, and both of said conveyors being constructed of material which permits slipping engagement of said conveyors with the bottles thereon when said bottles are prevented from moving therewith.

5. In a loader for bottle washing machines or the like: a relatively wide main conveyor; a feed conveyor having a bottle transferring section extending transversely of the main conveyor in a position to transfer bottles to the latter; baffling means positioned to prevent bottles from leaving the feed conveyor until after they have travelled transversely inwardly a substantial distance relative to the width of the main conveyor; and additional baffling means defining the inner end of said bottle transferring section spaced inwardly relative to the width of said main conveyor and overlapping said main and feed conveyors for diverting bottles from said bottle transferring section laterally toward said main conveyor, said additional baffling means being positioned for engagement by bottles on both the feed conveyor and the main conveyor.

6. In a loader for bottle washing machines or the like: a relatively wide main conveyor; a feed conveyor having a bottle transferring section extending transversely of the main conveyor in a position to transfer bottles to the latter; a first baffle extending along one side of the feed conveyor in a position to prevent bottles from leaving the feed conveyor until after they have travelled transversely inwardly a substantial distance relative to the width of the main conveyor; a second baffle connected to the inner end of said first baffle and extending obliquely outwardly over said main conveyor, said second baffle being positioned for engagement by bottles on the main conveyor; and a third baffle defining the inner end of said bottle transferring section and spaced inwardly relative to the width of said main conveyor and overlapping said main and feed conveyors for diverting bottles from said bottle transferring section laterally toward said main conveyor, said third baffle being positioned for engagement by bottles on both the feed conveyor and the main conveyor.

7. In a loader for bottle washing machines or the like: a relatively wide horizontally disposed conveyor for moving standing bottles positioned at random thereon toward the machine, a plurality of laterally spaced flat members positioned edgewise over a portion of said conveyor and having upright end edges toward which said conveyor moves, said edges being exposed to contact with the approaching bottles, the spaces between said flat members forming channels each of a width to receive one bottle at a time, said flat members being mounted for swinging movement in a substantially vertical plane to dislodge bottles which might jam against said exposed upright edges before entering said channels, and means for causing said swinging movement of said flat members.

8. In a loader for bottle washing machines or the like: a relatively wide horizontally disposed conveyor for moving standing bottles positioned at random thereon toward the machine, a plurality of laterally spaced flat members positioned edgewise over a portion of said conveyor and having upright edges toward which said conveyor moves, said edges being exposed to contact with the approaching bottles, the spaces between said flat members forming channels each of a width to receive one bottle at a time, said flat members being mounted for oscillatory swinging movement in a substantially vertical plane to dislodge bottles which might jam against said exposed upright edges before entering said channels, and means for causing said oscillatory swinging movement of said flat members.

9. In a loader for bottle washing machines or the like; a relatively wide horizontally disposed conveyor for moving standing bottles positioned at random thereon toward the machine, a plurality of laterally spaced flat members positioned edgewise over a portion of said conveyor and having upright end edges toward which said conveyor moves, said edges being exposed to contact with the approaching bottles, the spaces between said flat members forming channels each of a width to receive one bottle at a time; a shaft supported in a position where it extends transversely above said conveyor, said flat members being connected to said shaft for swinging movement in a substantially vertical plane, and means for causing movement of said shaft with resulting movement of said flat members to dislodge bottles which might jam against said exposed upright edges before entering said channels.

10. In a loader for bottle washing machines or the like: a relatively wide horizontally disposed conveyor for moving standing bottles positioned at random thereon toward the machine, a plurality of laterally spaced flat members positioned edgewise over a portion of said conveyor and having upright end edges toward which said conveyor moves, said edges being exposed to contact with the approaching bottles, the spaces between said flat members forming channels each of a width to receive one bottle at a time; a shaft supported in a position where it extends transversely above said conveyor, said flat members being connected to said shaft for swinging movement in a substantially vertical plane, and cam operated means for causing movement of

said shaft with resulting movement of said flat members to dislodge bottles which might jam against said exposed upright edges before entering said channels.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
530,583	Dumke	Dec. 11, 1894
804,459	Ellingwood	Nov. 14, 1905
1,454,520	Purcell	May 8, 1923
1,495,610	Paridon	May 27, 1924
1,558,016	Kiefer	Oct. 20, 1925
1,664,637	Merseles	Apr. 3, 1928
1,931,114	Olney	Oct. 17, 1933
2,183,433	Rheinstrom	Dec. 12, 1939
2,187,842	Rheinstrom	Jan. 23, 1940
2,440,419	Trier	Apr. 27, 1948
2,456,040	Alling	Dec. 14, 1948
2,535,804	Marvin	Dec. 26, 1950