F. METCALF & E. DALGLEISH.

BOTTLE POSITIONING AND FILLING APPARATUS.

APPLICATION FILED AUG. 20, 1913.

1,187,003. Patented June 13, 1916.

2 SHEETS—SHEET 1.

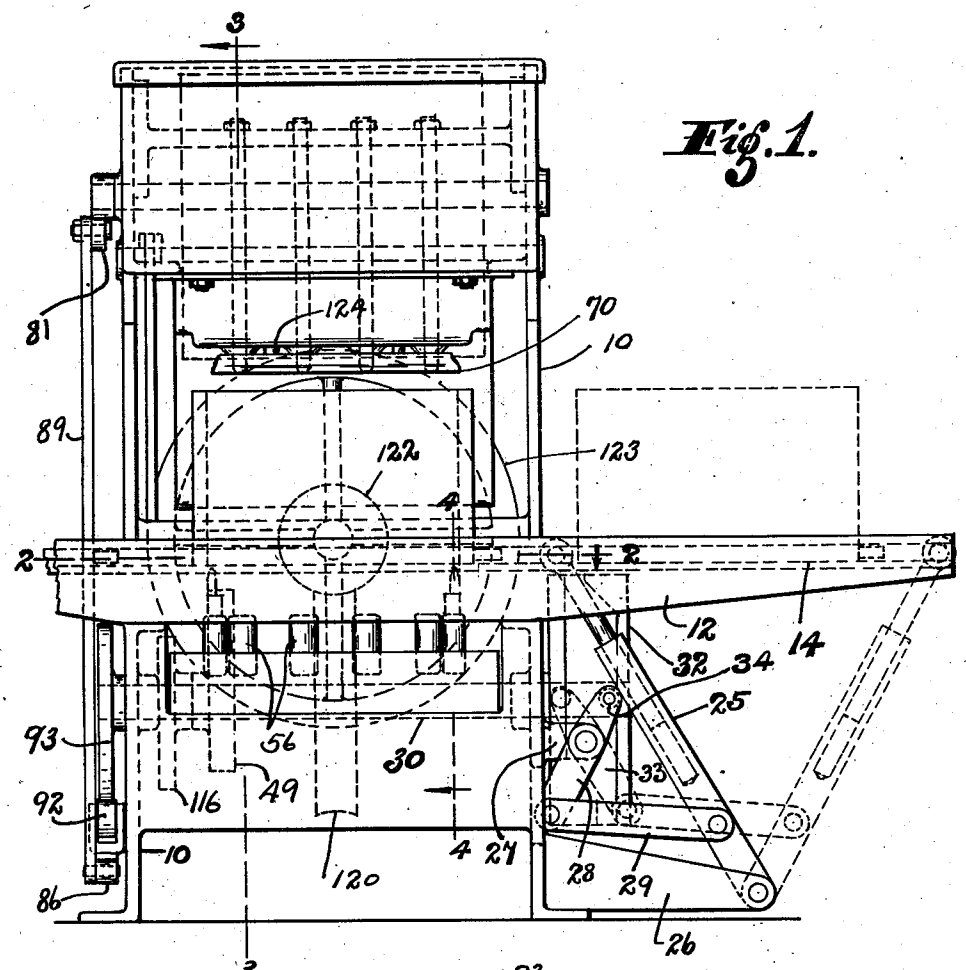


Fig. 1.

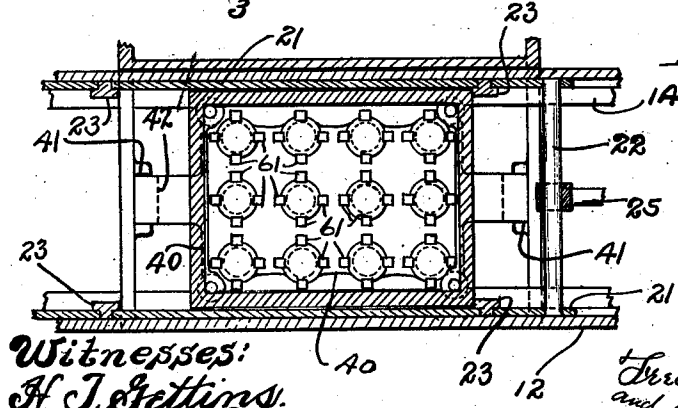


Fig. 2.

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Fig. 3

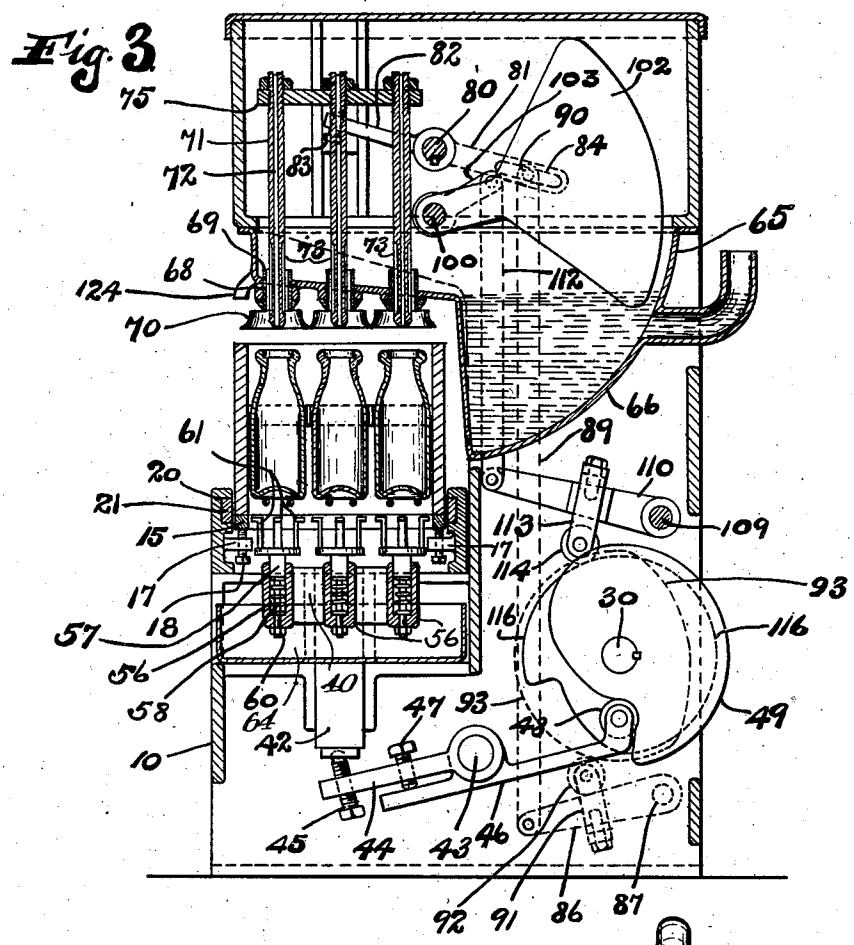
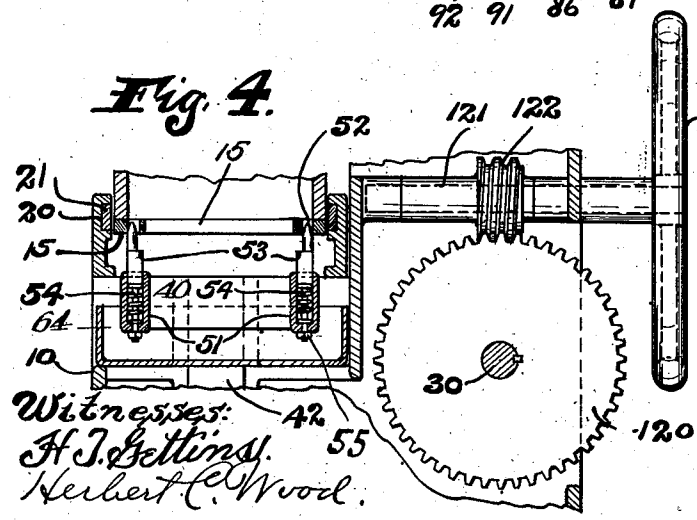


Fig. 4.



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UNITED STATES PATENT OFFICE.

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BOTTLE POSITIONING AND FILLING APPARATUS.

1,187,003. Specification of Letters Patent. Patented June 13, 1916.

Application filed August 20, 1913. Serial No. 785,651.

To all whom it may concern:

Be it known that we, FREDERICK METCALF, a citizen of the United States of America, and a resident of Cleveland, in the county of Cuyahoga and State of Ohio, and EDMUND DALGLEISH, a citizen of the United States of America, and a resident of Lakewood, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Bottle Positioning and Filling Apparatus; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

This invention relates to new and useful improvements in bottle positioning and filling apparatus.

One object of this invention is to provide means for handling boxes or crates of bottles so that the bottles may be readily adjusted to a predetermined position and with their mouths centered relative to fixed points.

A further object of the invention is to provide new and improved apparatus for filling the bottles with a liquid, which apparatus is very simple in construction, easily cleaned and kept in a sanitary condition and which will fill the bottles to a predetermined height and eliminate all waste by leakage or overflow.

A further object of the invention is to provide filling means of the kind indicated which will have no valves in the filling tubes, so that the liquid can flow freely into the bottles, thereby securing a rapid flow and reducing the tendency of the liquid to foam.

With these objects in view and with the intention of securing other advantages which will hereinafter appear, the invention consists in certain new and improved features of construction and combination of parts, described in the following specification, particularly pointed out in the claims and illustrated in their preferred form in the accompanying drawings.

In the accompanying drawings, Figure 1 is a view in elevation of a machine embodying the invention. Fig. 2 is a section on line 2—2, Fig. 1. Fig. 3 is a section on line 3—3, Fig. 1. Fig. 4 is a section on line 4—4, Fig. 1.

Again referring to the drawings 10 represents an upright rectangular main-frame, and for convenience of description we will term the face of the frame shown in Fig. 1 the front of the machine. Across the front of the frame and extending transversely of the frame and projecting a distance beyond each side of the frame are arranged two spaced members 12 which are suitably supported in said frame and together form a stationary bed. On the inner faces of the members 12 of the bed are arranged tracks shown at 14. These tracks 14 extend inwardly from each end of the bed but at the center of the bed there is a space across which the tracks do not extend, and this space is filled by a rectangular frame 15, which forms the center portion of the tracks and which may be termed the crate-receiving frame. This frame is mounted so that it is free to move up or down and is supported by lugs 17 arranged on the inner faces of the members 12. Each of these lugs carries a vertically arranged adjusting screw 18 and the said frame 15 rests on the said screws and by adjusting the screws the level of the frame 15 can be made to correspond with the stationary tracks 14. In the inner face of each of the members 12 of the bed, above the tracks 14, is formed a horizontally arranged groove 20 which forms a slideway for a push bar 21. The said push bars 21 are preferably connected by cross members 22 and each push bar is provided with a pair of spaced lugs 23, the said lugs on the push bars being arranged opposite each other and on the inward movement of the said push bars the rearmost lugs on the said bars are adapted to engage with a crate standing on the tracks at one end of the bed and the foremost lugs are adapted to engage with a crate standing on the crate-receiving frame 15. When the bars are moved inwardly they shove the crate from the crate-receiving frame to the opposite end of the bed and the crate from the tracks onto the crate-receiving frame 15.

A lever 25, which consists of two telescoping sections, has its lower end pivotally mounted at the end of an arm 26 which is secured to the side of the main frame and its other end is pivotally secured to a cross

member 22 which connects the said push bars 21. Above the arm 26 on the side of the main frame is arranged an arm 27 and on said arm 27 is pivotally mounted a lever 28, the said lever 28 being pivoted at a point intermediate of its ends. The lower end of said lever 28 is connected by a link 29 with the lever 25 at a point a short distance above the lower end of said lever 25. A cam shaft 30 extends from side to side of the main frame and projects at each side beyond the main frame and on the projecting end of said shaft 30 adjacent to the lever 28 is secured a cam wheel 32 which has a cam groove 33 on its perimeter. In the upper end of the lever 28 is a pin 34 which extends into said cam groove 33, and the contour of the cam groove 33 is such that during the rotation of the cam wheel in one direction the upper end of the lever 28 will be swung out from the side of the main frame, and the lower end of said lever will be swung in toward the side of the main frame, and the lever will then remain stationary for a predetermined length of time, and during the rotation of the cam wheel in the opposite direction the upper end of the lever 28 will be swung in toward the side of the main frame and the lower end will be swung out from the side of the main frame and the lever will then remain stationary for a predetermined length of time. As the lower end of the lever 28 is connected by the link 29 with the lever 25 the oscillation of said lever 28 will produce a corresponding oscillation of the lever 25 and as said lever 25 is connected with the push bars 21 the oscillation of said lever 25 will produce a reciprocating motion of said push bars, and on their inward travel said push bars will push the crates along the bed as before described.

Below the crate-receiving frame 15 is arranged a plate 40, which in general dimensions corresponds to said crate-receiving frame 15. This plate 40 is mounted so as to have free vertical movement up and down, and the means for supporting and raising and lowering said plate 40 is arranged as follows: At each side of the main frame is formed a vertical guideway 41 and the plate 40 is provided at each side with a downwardly extending vertical leg 42. These legs 42 fit into the guideways 41 so as to slide freely therein. In the main frame adjacent to the lower ends of said legs 42 is mounted a shaft 43 which has bearings in the said main frame. On the shaft 43 are rigidly secured arms 44, the free ends of which extend under the legs 42 and carry screws 45, which are adapted to come in contact with the ends of said legs. A lever 46 is fulcrumed on the shaft 43 near one of the arms 44 and the inner end of said lever 46 extends under the arm 44, and said arm carries a screw 47 adapted to engage with said lever. The outer end of said lever 46 carries a roller 48. On the cam shaft 30 is secured a cam wheel 49, having the cam surface on the perimeter thereof, and adapted to engage with the roller 48. The formation of the cam surface on the cam wheel 49 is such that when the cam shaft 30 is rotated in one direction the outer end of the lever will be shoved down and will then be held stationary for a predetermined time and when the cam shaft is rotated in the opposite direction, the outer end of said lever will be permitted to rise and will then be held stationary for a predetermined length of time. Of course, when the outer end of the lever 46 is moved downwardly the inner end thereof is raised and through its operative connection with the plate 40 the said plate will be raised and when the outer end of the lever 46 is permitted to rise the said plate 40 will move down by gravity and will then remain stationary when the lever becomes stationary. At each corner of the said plate 40 is arranged a socket 51 and in said socket is slidably mounted a pin 52 which is provided, a short distance below its upper end, with an enlarged portion or shoulder 53. A coil spring 54 is arranged in the socket 51 around the pin and the upper end of the coil spring 54 abuts against the lower end of the shoulder 53 and the lower end of said coil spring rests on the bottom of the socket 51 so that the spring supports the pin 52 in the socket. The lower end of the pin 52 extends through the bottom of the socket 51 and carries a nut 55 and by screwing said nut up or down the tension of the spring 54 can be regulated. When the plate 40 is raised the pins 52 pass through holes at the corners of the crate-receiving frame and engage the sides of a crate arranged on said frame and position the crate relative thereto. The shoulders 53 on the pins 52 come in contact with the under side of the crate-receiving frame and on the continued upward movement of the plate 40 the pins 52 will shove up the crate-receiving frame together with the crate thereon and the springs 54 are made sufficiently strong so that they can support a loaded crate without being compressed. The plate 40 also carries a series of sockets 56 and there will be as many of these sockets as there are bottles in the crate on the crate-receiving frame and said sockets are arranged so that one socket will be directly under each bottle in a crate on the crate-receiving frame. In each socket 56 is arranged a pin 57 and a coiled spring 58 is arranged in the socket around the pin and the upper end of the spring 58 abuts against a shoulder 59 and the lower end of said spring rests on the bottom of said socket 56. The lower end of said pin 47 extends through the bottom of said socket 56 and carries a nut 60 by

means of which the tension of the spring 58 can be regulated. On the upper end of each pin 57 are arranged a series of prongs 61. When the plate 40 is raised the prongs 61 pass between the wires which form the bottom of the crate on the crate-receiving frame and engage with the bottles in the crate, the purpose of which will appear later. A drip pan 64 is mounted in the frame below the plate 40.

In the upper part of the main frame above and also to the rear of the crate-receiving frame is arranged the tank 65, which is deeper at the rear than it is at the front and the deeper portion indicated by 66 is quadrant shaped in cross-section. In order to distinguish the portion 66 from the rest of the tank we will term this portion the storage basin and it will be noted that the bottom of the tank where it extends over the crate-receiving frame is inclined toward this basin. In the bottom of said tank 65 where it extends over the crate-receiving frame are formed a number of openings 68 and these openings are arranged so that when a crate with bottles therein is placed on the crate-receiving frame the mouths of the said bottles will be directly under said openings and the number of the openings will depend on the size of the crate which the machine is designed to handle as there will be one opening for each bottle. In each of the openings 68 is arranged a nipple 69, the lower end of which is adapted to fit into the mouth of a bottle and tightly seal the same when the mouth of the bottle is pressed against said nipple. On the bottom of the tank around each nipple is arranged a downwardly extending annular flange 70 which is adapted to receive the top of the bottle and guide the mouth of the bottle to the nipple. A series of tubes 71 are supported above the tank, as will be explained later, so as to be capable of being raised and lowered and the lower ends of said tubes 71 are adapted to pass through the nipples 68 and then down into the bottles below said nipples. Each tube 71 has a passageway 72 which permits the air in the bottle to escape as the bottle is being filled. In the outer surface of each of the tubes 71 near the lower end thereof are formed slots or open ducts 73 and the adhesion between the walls of said ducts and the liquid causes the liquid to flow down the outside of the tube 71 instead of dropping directly from the nipple into the bottle. The upper ends of all the tubes 71 are supported in a plate 75 and the ends of the said plate extend into vertically arranged guideways 76 which leave the plate free to move vertically up or down while being held against lateral displacement. In the main frame adjacent to and slightly below said plate 75 is mounted a shaft 80, one end of which extends beyond the side of the said main frame and on the projecting end thereof is secured an arm 81 in the free end of which is formed a slot 84. On the said shaft 80 within the main frame is secured an arm 82 and the free end of this arm extends under the said plate 75 and is provided with an adjustment screw 83, the end of which is adapted to come in contact with said plate 75.

Near the bottom of the main frame on the outside thereof is pivotally mounted an arm 86 on a small stud 87 and the free end of said arm 86 is connected with the free end of the arm 81 by means of a link 89 the lower end of the said link being pivotally secured to the free end of said arm 86 and the upper end of said link being provided with a pin 90 which fits into the slot 84 in said arm 81. On the arm 86 intermediate of its ends is mounted a small bracket 91, which carries a roller 92. On the cam shaft 30 is mounted a cam wheel 93 having a cam surface on the perimeter thereof, which is arranged to come in contact with the roller 92. When the cam wheel 93 is rotated in one direction the cam surface thereof will engage with the roller 92 shoving down said roller and consequently swinging down the arm 86 and when the cam wheel is rotated in the opposite direction the said roller is permitted to move up which consequently allows the said arm 86 to move up. It will be readily understood that when the arm 86 is swung down it will draw down the outer end of the arm 81 thereby swinging up the inner end of the arm 82, which, in turn, raises the plate 75, and also when the arm 86 is permitted to move up the said plate 75 will move down of its own weight.

Above the tank 65 is arranged a shaft 100 the ends of which are suitably supported in the main frame. On said shaft 100 is rigidly secured a sector shaped block 102, which we term the displacement block, and the said block is adapted to swing down into the storage basin 66 when the said shaft 100 is rotated. To the said shaft 100 is also rigidly secured a crank arm 103. Below the storage basin and slightly to the rear thereof is mounted a shaft 109 and on this shaft is pivotally mounted an arm 110, the said arm 110 being connected with the crank arm 103 by means of a link 112. The arm 110 carries a small bracket 113 on which is mounted a roller 114. On the cam shaft 30 is arranged a cam wheel 116, having a cam surface arranged on the perimeter thereof and adapted to come in contact with the roller 114. When said cam wheel 116 is rotated in one direction the roller 114 will be moved up and consequently the arm 113 will be swung up and when the cam wheel is rotated in the oppo-

site direction the roller 114 will be permitted to move down and consequently the arm 113 will be allowed to swing down. It will be readily understood that when the arm 110 is free to move down the displacement block 102 will be free to swing down of its own weight into the storage basin 66 and that when the said arm 110 is swung up it will lift the said displacement block out of the said storage tank.

On the cam shaft 30 is secured a gear wheel 120 and adjacent to said gear wheel is arranged a shaft 121 which carries a worm 122 arranged to engage with said gear wheel 120. On the outer end of said shaft 121 is mounted a hand wheel 123.

On the bottom of the tank 65 at the front and rear thereof are arranged stops 124.

The operation of the machine is as follows: All the movements of the various parts of the machine are brought about by the operator first turning the hand wheel 123 to the left and then back again to the right and Fig. 1 shows the parts of the machine in the position they occupy at the completion of the movement of the hand wheel to the right and we may designate this as the initial position of the machine. When the operator starts to turn the hand wheel 123 to the left the working face of the cam 49 engages the roller 48 on the lever 46 thereby swinging down the outer end of said lever 46 and consequently swinging up the arm 44 which is in engagement with the inner end of said lever 46 and said arm 44 being in engagement with the legs 42 of the plate 40 shoves up the said plate 40. As the plate 40 moves up the positioning pins 52 pass up through holes in the crate-receiving frame and engage the sides of the crate standing thereon, thereby centering said crate with respect to the said frame and the other portions of the machine. The shoulders 53 engage with the under side of the crate-receiving frame and on the continued upward movement of said crate the said crate-receiving frame is shoved up together with the crate thereon until the top of the crate comes in contact with the stop 124 when the upward movement of said crate is arrested. The plate 40 will continue to move up and the prongs 61 on the ends of the pins 57 will be brought into contact with the bottoms of the bottles in the crate and the bottles will be shoved up independently of the crate so that the mouths thereof will be tightly pressed against the lower ends of the nipples 68, thereby tightly sealing the mouths of the bottles. The roller 48 will then be in contact with the dead surface of the said cam 49 so that the lever 46 will remain stationary for the time being. At the same time the cam wheel 32 actuates the lever 28 swinging the lower end out which, through its operative connection with the push bars 21, causes said push bars to be drawn out on the bed of the machine and in position to engage with a new crate placed on the tracks 14, as shown in dotted lines in Fig. 1. On the continued rotation of the hand wheel 123 in the same direction, the cam wheel 93 will be rotated to a position which will permit the roller 92 to move up and thereby allow the plate 75, which carries the tubes 71 to move down. The tubes will enter the bottles and approach close to the bottoms thereof, thereby permitting the liquid to enter the bottles without having to fall any perceptible distance after it leaves the tubes, thereby preventing the liquid from foaming. On the continued rotation of the hand wheel 123 in the same direction the cam wheel 116 will permit the roller 114 to move down, which, in turn, allows the displacement block 102 to swing down into the storage tank and as the displacement block enters said storage tank the liquid therein will be caused to rise and flood the bottom of the tank where it extends over the bottles and submerge the nipples 68. The liquid will then flow down through the nipples and through the ducts on the tubes into the bottles. The displacement block will then remain stationary for a time. On the continued rotation of the hand wheel 123 the cam wheel 93 engages the roller 92 so as to press down said roller and consequently swing up the arm 82 thereby raising the plate 75 and withdrawing the tubes from the bottles. This movement is so regulated that the tubes will move up just a little ahead of the liquid as it rises in the bottles so that the ends of the said tubes are never submerged in the liquid, for if they were it would of course prevent the escape of air from the bottles. The hand wheel 123 is then reversed and the cam wheel 116 engages with the roller 114 shoving it up and consequently lifting the displacement block 102 out of the storage tank. The liquid in the tank would then flow back into the storage basin and the nipples 68 will no longer be submerged in said liquid. It will be here noted that at this point of the operation of the machine the bottles will be full of liquid as also the nipples above the bottles so that if the bottles were removed immediately the liquid in the nipples would run out and be wasted. Therefore in order to return the liquid which is in the nipples back to the storage tank the tubes are utilized to displace a predetermined quantity of liquid from the bottles so that it may flow back into the storage tank and the following movement of the machine accomplishes this result. On the continued movement of the cam shaft the roller 92 will be permitted to rise so that the plate 75 will descend and once more the tubes 72 will be lowered into the bottles

but this time the tubes serve as displacement members and as the tubes enter the bottles the liquid in said bottles will be displaced and caused to flow up into the tank again and drain back into the storage basin. The insertion of the said tubes in said bottles will displace such a quantity of liquid that when the tubes are again withdrawn the liquid which is in the nipples will be sufficient to exactly fill the said bottles. The plate will then be immediately raised to its upper position. On the continued movement of the hand wheel to the left the cam wheel 49 permits the roller 48 to move up thereby allowing the inner end of the lever 46 to swing down, which permits the plate 40 to move down by gravity carrying the crate and the crate-receiving frame with it. As soon as the crate-receiving frame reaches its lowest position the cam wheel 32 engages the lever 28 swinging the lower end thereof in which, through its operative connection with the push bars 21, causes said push bars 21 to move in on the bed and as they move in they shove the crate from the crate-receiving frame on to the tracks at the opposite side of the bed and the crate from the tracks onto the crate-receiving frame. The rotation of the hand wheel is then stopped and the parts of the machine are again in the position shown in Fig. 1.

What we claim is:—

1. In an apparatus of the character described, the combination of a bed, a crate-receiving frame supported on said bed and having free vertical movement up or down, a plate arranged beneath said frame, spring members carried by said plate and adapted to engage with said crate-receiving frame and spring supported members carried by said plate and adapted to engage with the bottom of bottles carried by a crate on the crate-receiving frame, for the purpose set forth.

2. In an apparatus of the character described, the combination of a main frame, a crate-receiving frame supported on said main frame so as to have free vertical movement up or down, a plate arranged beneath said crate-receiving frame, positioning pins arranged at each corner of said plate and adapted to pass up through the crate-receiving frame and engage the sides of a crate carried by said crate-receiving frame, said pins being provided with shoulders arranged to engage with said crate-receiving frame, bottle lifting members arranged on said plate, springs for resiliently supporting said bottle lifting members and means for raising and lowering said plate.

3. In an apparatus of the character described, the combination of a main frame, a crate-receiving frame supported in said frame so as to have free vertical movement, a plate arranged beneath said crate-receiving frame, positioning pins arranged at the corners of said plate and adapted to pass through said crate-receiving frame and engage a crate thereon, said pins being provided with shoulders arranged to engage the under side of the crate-receiving frame, bottle lifting members mounted on said plate, springs arranged on said plate so as to support said bottle lifting members, legs extending downwardly from said plate, a shaft mounted in said main frame, lifting means mounted on said shaft, one end of said means being adapted to engage with said legs and a cam wheel mounted in proximity to and adapted to engage with the other end of said means so as to impart an oscillating movement to said means, for the purpose set forth.

4. In an apparatus of the character described, the combination of a main frame, a crate-receiving frame supported in said frame so as to have free vertical movement, a plate arranged beneath said crate-receiving frame, pins arranged at the corners of said plate and adapted to pass through said crate-receiving frame and engage a crate thereon, said pins being provided with shoulders arranged to engage the under side of the crate-receiving frame, legs extending downwardly from said plate, a shaft mounted in said main frame, lifting means mounted on said shaft, one end of said means being adapted to engage with said legs and a cam wheel mounted in proximity to and adapted to engage with the other end of said means so as to impart an oscillating movement to said means, for the purpose set forth.

5. In a device of the character described, the combination of the bed, a stop arranged above said bed, means for supporting a crate on said bed, resilient means for raising said means for supporting said crate so as to bring said crate in contact with said stop, means for resiliently supporting the bottles in said crate independently of said crate and means for raising said means for resiliently supporting said bottles.

6. In an apparatus of the character described, the combination of a main frame, a crate-receiving frame supported in said frame so as to have free vertical movement, a plate arranged beneath said crate-receiving frame, pins arranged at the corners of said plate and adapted to pass through said crate-receiving frame and engage a crate thereon, said pins being provided with shoulders arranged to engage the under side of the crate-receiving frame, pins mounted on said plate and provided with prongs arranged to pass up through the bottom of the crate and engage the bottom of the bottles therein, springs arranged on said plate so as to support the last mentioned pins, legs extending downward from said plate, a

shaft mounted in said frame, arms secured on said shaft and arranged to extend under said legs, a lever fulcrumed in proximity to the said arms and adapted to engage with one of said arms, a cam wheel arranged to engage with said lever, and means for rotating said cam wheel.

In testimony whereof, we sign the foregoing specification, in the presence of two witnesses.

FREDERICK METCALF.
EDMUND DALGLEISH.

Witnesses:
VICTOR C. LYNCH,
N. L. MCDONNELL.