May 11, 1948. W. I. REILLY 2,441,289

BOTTLE RELEASE MECHANISM

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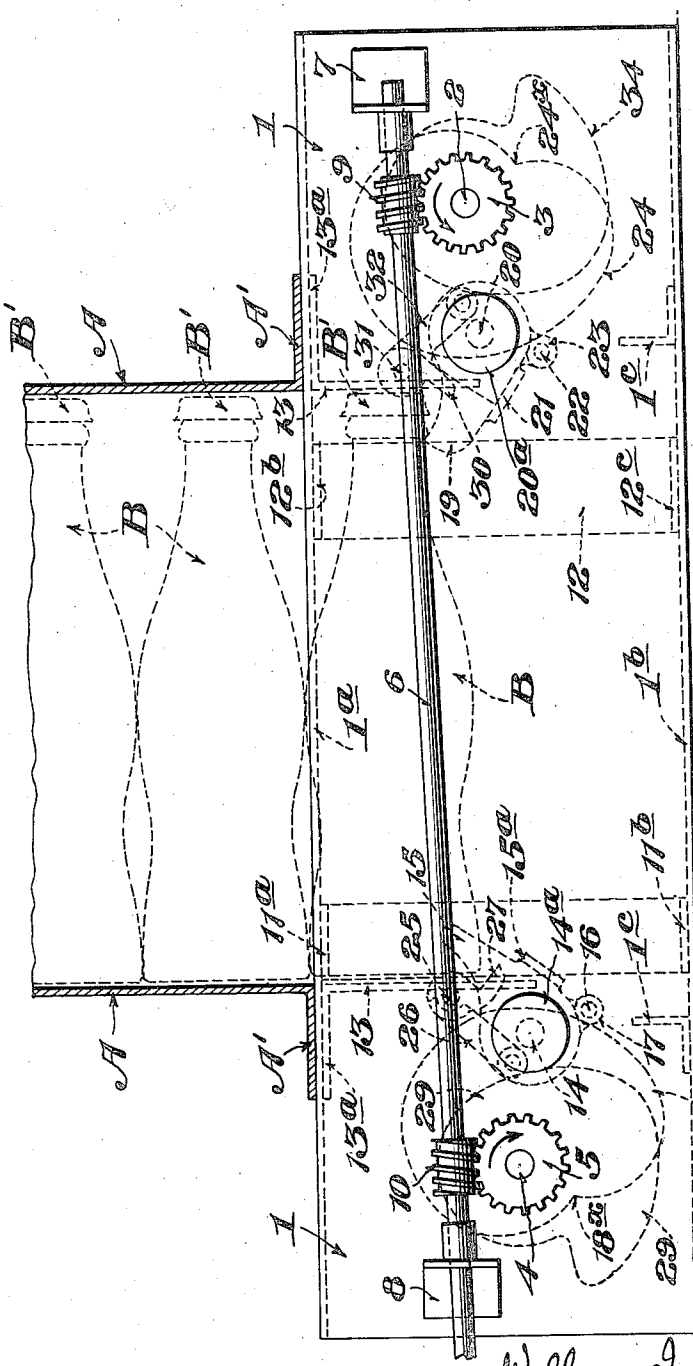


Fig. 1.

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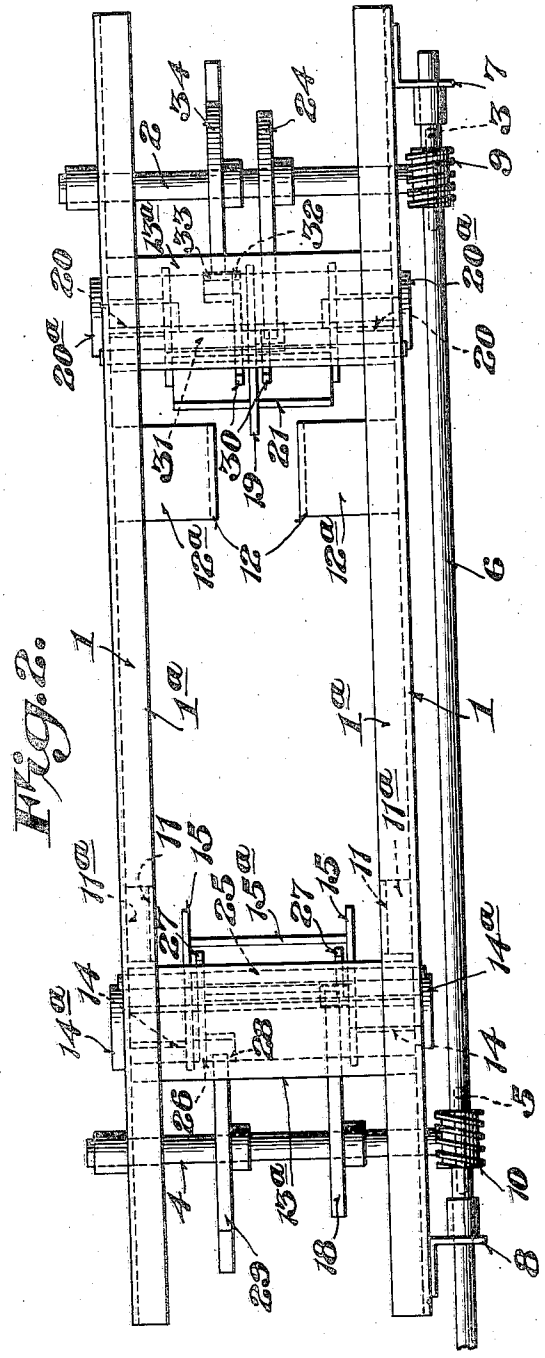


Fig. 2.

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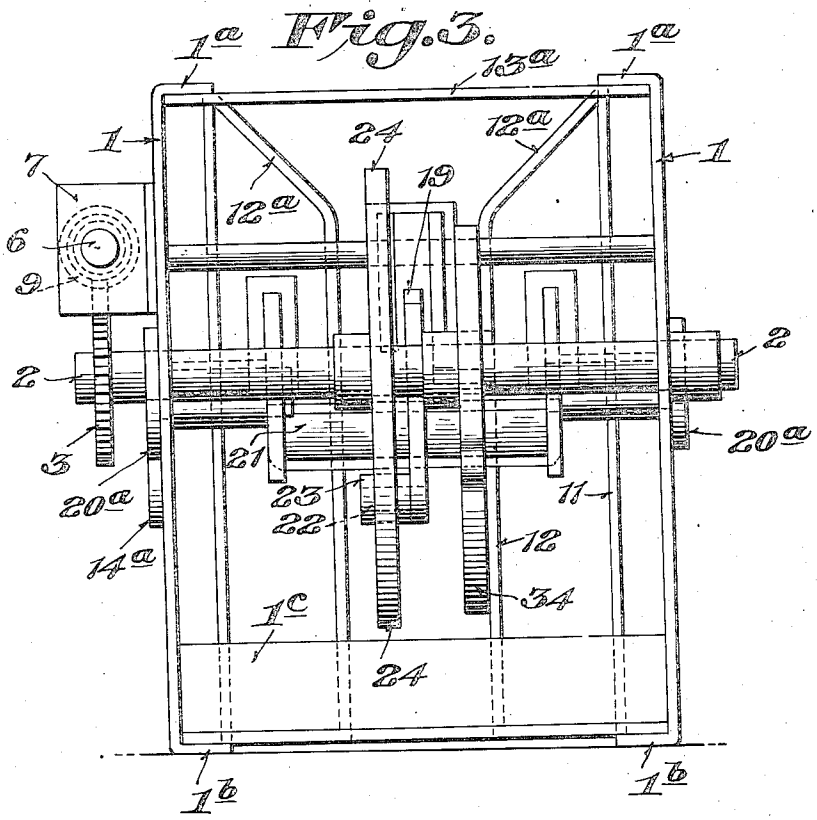
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BOTTLE RELEASE MECHANISM

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Fig. 3.



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BOTTLE RELEASE MECHANISM

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Application October 20, 1947, Serial No. 780,942

14 Claims. (Cl. 312—48)

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This invention relates to a bottle dispensing mechanism, and the principal object of the invention is to provide means for successively discharging bottles, arranged in stacks in which the bottles are disposed substantially horizontally, when the mechanism is operated.

Heretofore oppositely rotated star wheels have been utilized, arranged at each end of the bottoms of the stacks for successively dispensing the lowermost bottle, but star wheels are so shaped that as the lowermost bottle is being lowered into the discharge chute columns of superimposed bottles would not be positively supported at a substantially constant level, owing to the limitations of the shape of the star wheels, and therefore the columns of bottles in the stacks would be subjected to undue jarring, often resulting in breakage of the bottles or in jamming of the dispensing mechanism.

The principal object of the present invention is to provide a construction utilizing pairs of trigger fingers operated by individual cam means disposed at each end of the stacks, one set of trigger fingers being adapted to support the lowermost bottles, while being lowered into the discharge chute, and the other set of fingers being adapted to support at substantially constant level the columns of superimposed bottles just prior to and during the discharge of the lowermost bottles, thereby resulting in minimum jarring or jolting of the columns of bottles, and less injury or breakage to the bottles in the stacks; also resulting in smooth operation of the dispensing mechanism.

I will explain the invention with reference to the accompanying drawings, which illustrate one practical embodiment thereof, to enable others familiar with the art to adopt and use the same; and will summarize in the claims the novel features of construction, and novel combinations of parts, for which protection is desired.

In said drawings:

Figure 1 is a side elevation, partly in section, showing a column of bottles arranged in a stack, with my novel dispensing mechanism applied to the lower end of the stack.

Fig. 2 is a top plan view of the dispensing mechanism, with the stack removed.

Fig. 3 is an end elevation of the dispensing mechanism.

In Fig. 1, the reference numeral A indicates a vertical stack in a bottle refrigerating and dispensing mechanism, or other mechanism well known in the art, a plurality of bottles B, indicated in dotted lines, disposed substantially horizontally in the stack with the caps B' at one end thereof, the lower bottle B of the stack being adapted to be dispensed upon the well-known discharge chute (not shown) on each operation of the mechanism in well known manner such as upon each insertion of a coin in the coin slot (not shown) of the machine, or upon each manipulation of the actuating shaft of the machine which may be either manually or power operated.

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At the lower ends walls of stack A are outturned flanges A' (Fig. 1) and at the lower ends of the sides of stack A are spaced parallel plates 1 having inturned flanges 1*a* at their upper ends and inturned flanges 1*b* at their lower ends, flanges 1*a* being secured by spot welding or the like to the outturned flanges A' of stack A. Plates 1 are maintained separated a distance somewhat greater than the width of the stack A so that the bottles B in the stack may pass therebetween. Angle bars 1*c* connect the flanges 1*b* of plates 1 and are disposed beyond the ends of stack A.

Journaled in the plates 1—1 adjacent one end thereof is a cam shaft 2 carrying a worm gear 3, while adjacent the other end of plates 1—1 is a cam shaft 4 carrying a worm gear 5 which is pitched in an opposite direction from the worm gear 3, for the purpose hereinafter described. Above worm gears 3 and 5 is a drive shaft 6 journaled in brackets 7 and 8 on one of the plates 1, shaft 6 carrying a worm 9 meshing with the worm gear 3 and also carrying an oppositely pitched worm 10 meshing with the worm gear 5, whereby as the shaft 6 is rotated, the shafts 4 and 2 will be rotated at the same speed but in opposite directions indicated by the arrows in Fig. 1 for the purpose hereinafter described. Shaft 6 is rotated by manual or automatic control means of the machine the same being usually actuated upon the deposit of a coin in the coin slot of the machine. As shown, shaft 4 is disposed at a lower elevation than the shaft 2, in order that the bottles B in the stack A may be supported in substantially horizontal position therein, the bases of the bottles being of greater diameter than the caps B' thereof; and thus the shaft 6 is shown as disposed at an inclination to the horizontal in Fig. 1.

The inturned flanges 1*a* and 1*b* of plates 1—1 are sufficiently separated to permit a bottle B to pass therethrough, but in order to properly guide the bottles between the plates 1—1 guide plates 11 are provided having upper and lower outturned flanges 11*a* and 11*b* received between the flanges 1*a* and 1*b* of plates 1—1 adjacent the shaft 4, the plates 11 terminating flush with the

outer ends of the flanges 1*a*—1*b* of the plates 1 for guiding the bases of the bottles B while being discharged between the plates 1—1. Adjacent the opposite end of stack A are guide plates 12 which are vertically disposed and spaced apart a distance sufficient to permit the necks of the bottles to pass downwardly therebetween, the upper portions of the plates 12 being flanged outwardly as at 12*a* (Fig. 3), the upper ends of the flange portions 12*a* having outturned flanges 12*b* (Fig. 1) underlying the inturned flanges 1*a* of the plates 1—1, and the lower ends of the guide plates 12 having outturned flanges 12*c* overlying the inturned flanges 1*b* of the plates 1—1. Thus, in passing between the plates 1—1, the bottles B being dispensed will be prevented from shifting laterally so as to become jammed upon the inturned flanges 1*b* of the plates 1—1.

At each end of the stack A, forming a continuation of the end walls thereof, are vertically disposed plates 13 (Fig. 1) fitting between the plates 1—1, said plates 13 having flanges 13*a* at their upper ends underlying the flanges 1*a* of plates 1, said flanges 13*a* being secured to the flanges 1*a* by spot welding or in any other desired manner. Plates 13 extend downwardly between the plates 1 for a distance approximating half of the height of the plates 1.

Journaled between the plates 1—1, between shaft 4 and the adjacent plate 13, are aligned shaft sections 14—14 having enlarged heads 14*a* at their outer ends contacting the outer faces of plates 1—1, the inner ends of the shaft sections 14*a* carrying spaced parallel lowering fingers 15, connected together by a plate 15*a*, said fingers 15 being adapted in the position shown in Fig. 1 to receive therebetween the base of the lowermost bottle B in stack A and to center the bottle B between the plates 1—1. The lowering fingers 15 are rigidly secured to their respective shaft sections 14 so as to form a unit causing both fingers 15 to be raised and lowered simultaneously, the fingers 15 being adapted to extend through slots in the lower end of the adjacent plate 13 so that the same may pivot vertically between the plates 1—1.

Journaled in the lowering fingers 15 below the shaft 14 is a shaft 16 carrying a roller 17 (Fig. 1) directly engaging a cam 18 fixedly mounted on the shaft 4, cam 18 controlling by reason of the contour thereof, the raising and lowering of the fingers 15, the cam 18 rotating in the direction of the arrow (Fig. 1).

At the opposite end of stack A is a single cam finger 19 disposed midway between the guides 12 and operable for raising and lowering through a slot in the lower end of the adjacent plate 13, finger 19 being journaled on aligned shaft sections 20 having heads 20*a* engaging the outer faces of the plates 1—1. Finger 19 is carried by a plate 21 having its ends fixedly secured to the inner ends of the shaft sections 20, whereby the finger 19 and the shaft sections 20 rotate as a unit. Plate 21 carries a shaft 22 disposed below the shaft sections 20, carrying a roller 23 engaging a cam 24 similar but opposite to the cam 18 and rotating in the opposite direction than the cam 18, i. e., in the direction of the arrow in Fig. 1, cam 24 being fixedly mounted upon the shaft 2.

In the position of the fingers 15 and 19 shown in Fig. 1, the bottom bottle B in the stack A is being supported thereby between the plates 1—1, and fingers 15 and 19 are also supporting the superimposed bottles in the stack. As the shafts 2 and 4 are rotated in opposite directions by the shaft 6 the rollers 17 and 23 will ride upon their respective cams 18 and 24 and the fingers 15 and 19 will be maintained for a portion of one revolution of the cams 18 and 24 at the same elevation to support the bottles B, but when the rollers 17 and 23 reach the portions of the cams 18 and 24 which are progressively reducing in radius the fingers 15 and 19 will simultaneously lower continuously until reaching the portions 18*x* and 24*x* of the said cams, at which time the outer ends of the cam fingers 15 and 19 will be lowered to such point that they will be retracted behind their respective plates 13, thereby permitting the lowermost bottle B to drop between the plates 1—1 onto the discharge chute of the machine. After passing the cam points 18*x* and 24*x* the cams abruptly and progressively increase in radius to normal diameter, thereby quickly restoring the fingers 15 and 19 to their uppermost positions shown in Fig. 1, thus supporting the then lowermost bottle B of stack A.

In order to protect the stack of bottles above the one being discharged from undue jolting, a second set of holding fingers is provided which operate substantially alternately with the fingers 15 and 19. As shown in Fig. 1, a shaft 25 is journaled between the plates 1—1 above the shaft 14 and directly behind the adjacent plate 13, said shaft 25 having an arm 26 thereon and carrying a pair of spaced fingers 27 disposed inside the pair of fingers 15, said fingers 27 also operating in slots in the adjacent plate 13. Arm 26 carries at its inner end a roller 28 directly engaging a cam 29, also mounted on shaft 4 (Fig. 1), the cam 29 being so shaped that when the fingers 15—15 are in their uppermost position, shown in Fig. 1, the fingers 27—27 will be in their depressed position shown in Fig. 1. During the rotation of the cam 29 in the direction of the arrow (Fig. 1) the fingers 27—27 will be maintained in depressed position while the fingers 15—15 are commencing to lower, but before the fingers 15—15 reach their lowermost or discharge position, i. e., reach the point 18*x* of cam 18, the cam 29 will quickly thrust the fingers 27—27 into raised position and thereby engage the next lowermost bottle B in stack A, thus supporting the base end of the column of bottles in the stack prior to discharge of the lowermost bottle, and until the fingers 15 have been re-elevated into their uppermost position shown in Fig. 1.

Similarly, the opposite or cap end of the column of bottles is supported by fingers 30 similar to the fingers 27, said fingers 30 being mounted upon a shaft 31 journaled in the plates 1—1 behind the adjacent plate 13, the fingers 30 being disposed at opposite sides of the finger 19 and operating through slots in the plate 13. Shaft 31 carries an arm 32 provided with a roller 33 engaging a cam 34 similar but opposite to the cam 29, but being mounted on shaft 2 same rotates in the opposite direction. Fingers 27 and 30 are raised and lowered simultaneously, and are lifted by their respective cams 29 and 34 to support the column of bottles, above the lowermost bottle being discharged, prior to discharge of the lowermost bottle, the fingers 27 and 30 being progressively retracted as the fingers 15 and 19 are being raised by their respective cams 18 and 24 into normal raised position.

By the above arrangement, the cams 15 and 19 progressively lower the lowermost bottle B in the stack A, but before the lowermost bottle is

discharged, the fingers 27 and 30 will be simultaneously and quickly operated by the cams 29 and 34 to engage the next lowermost bottle in the stack, prior to discharge of the lowermost bottle, and thereby support the column of bottles during discharge, the fingers 27 and 30 being lowered after the fingers 15 and 19 have been re-elevated into contact with the then lowermost bottle previously supported by the fingers 27 and 30.

The above arrangement is simple in construction and operation, and results in a minimum jarring and breakage of bottle in the stacks, also results in smooth and quiet operation of the dispensing mechanism.

I do not limit my invention to the exact form shown in the drawings, for obviously changes may be made therein within the scope of the claims.

I claim:

1. A bottle dispensing mechanism for successively discharging bottles arranged horizontally in superimposed relation in a stack, comprising a pair of fingers at the ends of the stack respectively adapted when raised to engage the underside of the lowermost bottle in the stack; means for simultaneously raising and lowering the fingers, said fingers when lowered permitting the lowermost bottle to discharge through the stack; a second pair of fingers at the ends of the stack respectively adapted when raised to engage the underside of the next to lowermost bottle in the stack; means for simultaneously raising and lowering the second pair of fingers, said second pair of fingers when lowered permitting the latter bottle to gravitate downwardly therepast; said means for raising and lowering the pairs of fingers causing the second pair of fingers to be raised to support the next to lowermost bottle when the said bottle comes opposite the said fingers in the stack and while the first pair of fingers is lowering the lowermost bottle to discharge position, and causing the first set of fingers to be again raised to support the bottle which is then supported by the second pair of fingers before the said second pair of fingers is lowered.

2. In mechanism as set forth in claim 1, said fingers which support the base ends of the bottles being disposed at a lower level than the other fingers whereby the bottles in the stack will be disposed substantially horizontally.

3. A bottle dispensing mechanism for successively discharging bottles arranged horizontally in superimposed relation in a stack, comprising a pair of cam shafts journaled at opposite ends of the stack respectively beyond the bottle passage therethrough; means for simultaneously rotating the shafts in opposite directions and at the same speed; a pair of fingers at the ends of the stack respectively adapted when raised to engage the underside of the lowermost bottle in the stack; a pair of cams mounted on the cam shafts respectively and adapted to simultaneously raise and lower the fingers, said fingers when lowered permitting the lowermost bottle to discharge through the stack; a second pair of fingers at the ends of the stack respectively adapted when raised to engage the underside of the next to lowermost bottle in the stack; a second pair of cams mounted on the cam shafts respectively for simultaneously raising and lowering the second pair of fingers, said second pair of fingers when lowered permitting the latter bottle to gravitate downwardly therepast; said pairs of cams being so shaped that the second pair of fingers will be raised to support the next to lowermost bottle when the said bottle comes opposite the said fingers in the stack and while the first pair of fingers is lowering the lowermost bottle to discharge position, and the first set of fingers will be again raised to support the bottle which is then supported by the second pair of fingers before the said second pair of fingers is lowered.

4. In mechanism as set forth in claim 3, said fingers each carrying arms provided with rollers engaging the contours of the cams; and the cam shaft for the fingers which support the base ends of the bottles being disposed at a lower level than the other cam shaft whereby the bottles in the stack will always be disposed substantially horizontally.

5. In mechanism as set forth in claim 4, said cam shafts having oppositely pitched worm gears thereon; and said rotating means comprising an inclined shaft journaled in the frame adjacent the worm gears and having oppositely pitched worms thereon engaging the respective worm gears.

6. A bottle dispensing mechanism for successively discharging bottles arranged horizontally in superimposed relation in a vertical stack, comprising an open frame adapted to be secured to the lower end of the stack and through which the bottles are discharged; a pair of fingers pivoted on the frame at the ends of the stack respectively adapted when raised to engage the underside of the lowermost bottle in the frame; means for simultaneously raising and lowering the fingers, said fingers when lowered permitting the lowermost bottle to discharge through the frame; a second pair of fingers pivoted on the frame at the ends of the stack respectively adapted when raised to engage the underside of the next to lowermost bottle in the frame; means for simultaneously raising and lowering the second pair of fingers, said second pair of fingers when lowered permitting the latter bottle to gravitate downwardly therepast; said means for raising and lowering the pairs of fingers causing the second pair of fingers to be raised to support the next to lowermost bottle when the said bottle comes opposite the said fingers in the frame and while the first pair of fingers is lowering the lowermost bottle to discharge position, and causing the first set of fingers to be again raised to support the bottle which is then supported by the second pair of fingers before the said second pair of fingers is lowered.

7. In mechanism as set forth in claim 6, said frame comprising a pair of parallel plates; cross members connecting the lower ends of the plates beyond the ends of the stack; cross plates connecting the upper ends of the plates and forming continuations of the ends of the stack, said cross plates extending downwardly below the pairs of fingers and having their lower ends slotted to receive the pairs of fingers.

8. In mechanism as set forth in claim 7, a pair of spaced guides adjacent one cross plate carried by the frame plates and receiving therebetween the bases of the bottles; and a second pair of spaced guides adjacent the other cross plate carried by the frame plates and receiving therebetween the necks of the bottles.

9. In mechanism as set forth in claim 6, said fingers which support the base ends of the bottles being disposed at a lower level than the other fingers whereby the bottles in the stack and frame will always be disposed substantially horizontally.

10. A bottle dispensing mechanism for successively discharging bottles arranged horizontally in superimposed relation in a vertical stack, comprising an open frame adapted to be secured to the lower end of the stack and through which the bottles are discharged; a pair of cam shafts journaled in the frame beyond the ends of the stack respectively; means for simultaneously rotating the shafts in opposite directions and at the same speed; a pair of fingers pivoted on the frame at the ends of the stack respectively adapted when raised to engage the underside of the lowermost bottle in the frame; a pair of cams mounted on the cam shafts respectively and adapted to simultaneously raise and lower the fingers, said fingers when lowered permitting the lowermost bottle to discharge through the frame; a second pair of fingers pivoted on the frame at the ends of the stack respectively adapted when raised to engage the underside of the next to lowermost bottle in the frame; a second pair of cams mounted on the cam shafts respectively for simultaneously raising and lowering the second pair of fingers, said second pair of fingers when lowered permitting the latter bottle to gravitate downwardly therepast; said pairs of cams being so shaped that the second pair of fingers will be raised to support the next to lowermost bottle when the said bottle comes opposite the said fingers in the frame and while the first pair of fingers is lowering the lowermost bottle to discharge position, and the first set of fingers will be again raised to support the bottle which is then

supported by the second pair of fingers before the said second pair of fingers is lowered.

11. In mechanism as set forth in claim 10, said frame comprising a pair of parallel plates flanged inwardly at their top and bottom edges; cross members connecting the lower flanges beyond the ends of the stack; cross plates connecting the upper flanges of the plates and forming continuations of the ends of the stack, said cross plates extending downwardly below the pairs of fingers and having their lower ends slotted to receive the pairs of fingers.

12. In mechanism as set forth in claim 11, a pair of spaced guides in the frame adjacent one cross plate carried by the flanges and receiving therebetween the bases of the bottles; and a second pair of spaced guides in the frame adjacent the other cross plate carried by the flanges and receiving therebetween the necks of the bottles.

13. In mechanism as set forth in claim 10, said fingers each carrying arms provided with rollers engaging the contours of the cams; and the cam shaft for the fingers which support the base ends of the bottles being disposed at a lower level than the other cam shaft, whereby the bottles in the stack and frame will always be disposed substantially horizontally.

14. In mechanism as set forth in claim 13, said shafts having oppositely pitched worm gears thereon; and said rotating means comprising an inclined shaft journaled in the frame above the worm gears and having oppositely pitched worms thereon engaging the respective worm gears.

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