Feb. 18, 1958 G. J. OKULITCH ET AL 2,823,946

AUTOMATIC CASE FILLING MACHINE

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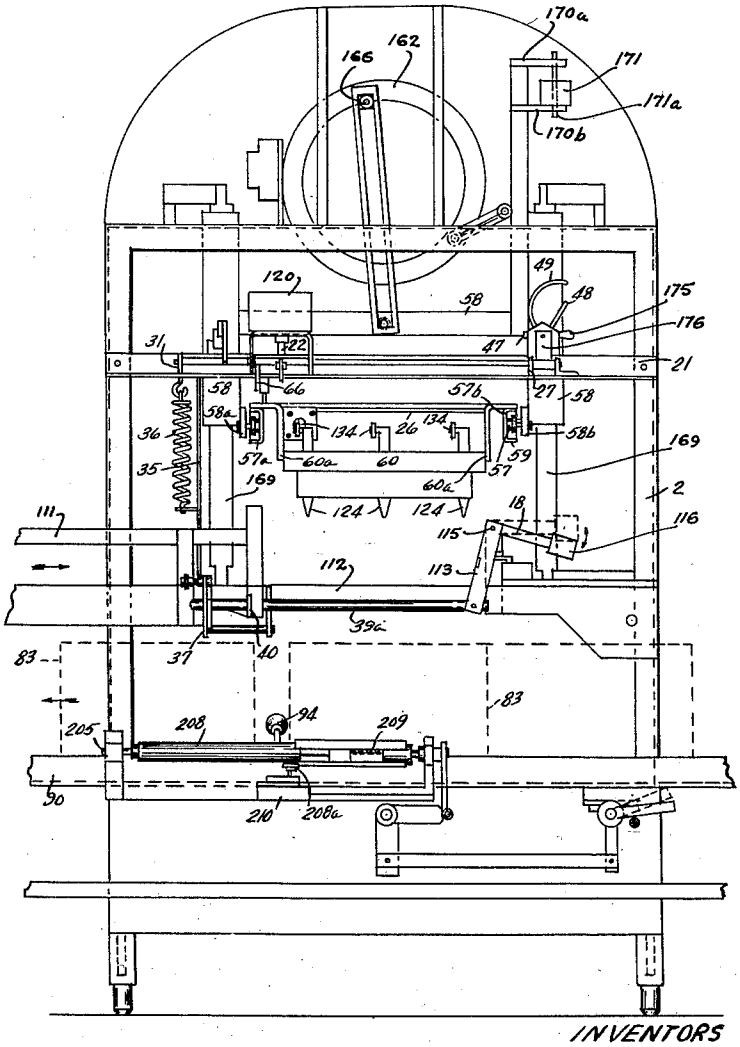


Fig. 1.

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AUTOMATIC CASE FILLING MACHINE

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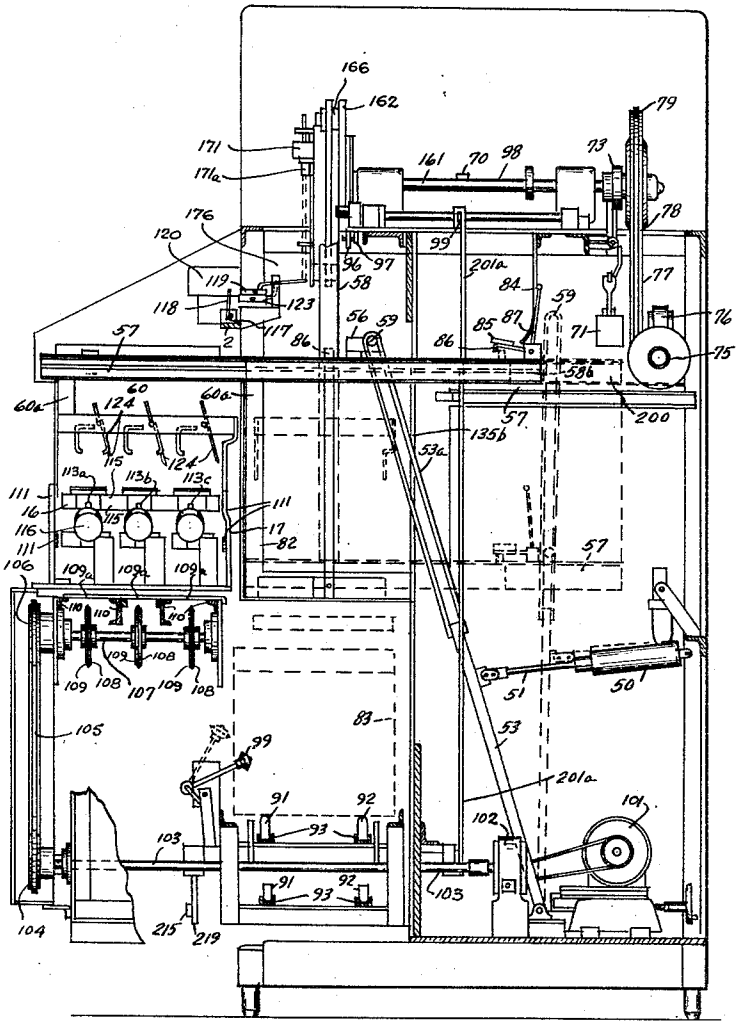


Fig. 2.

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AUTOMATIC CASE FILLING MACHINE

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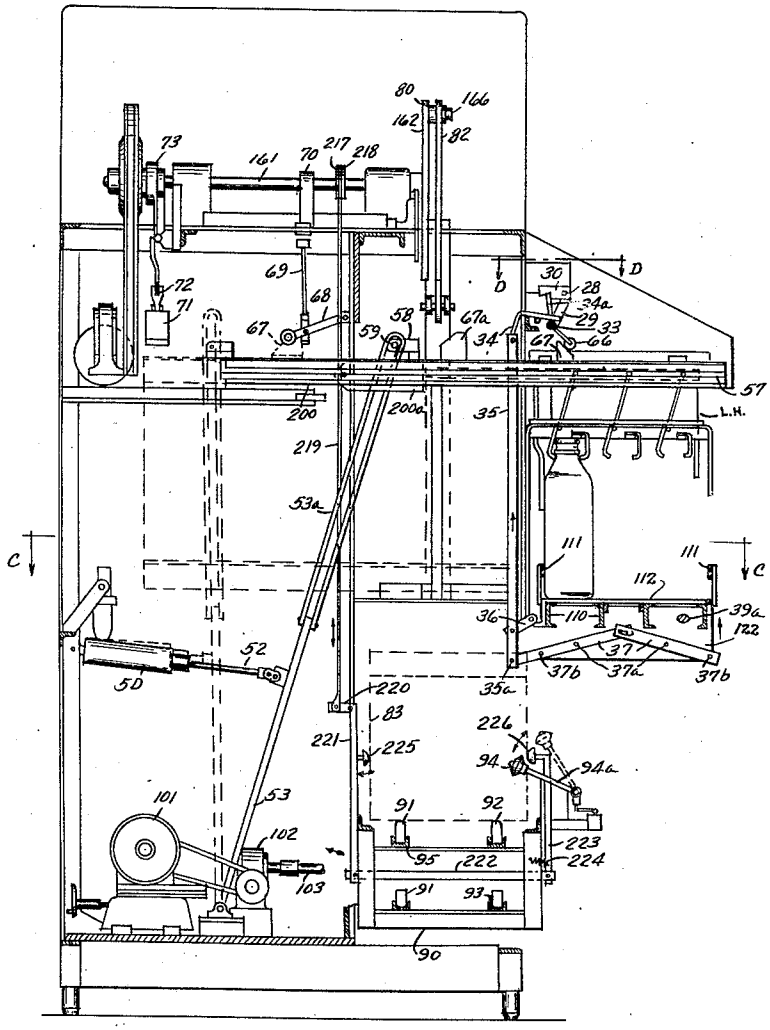


Fig. 3.

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AUTOMATIC CASE FILLING MACHINE

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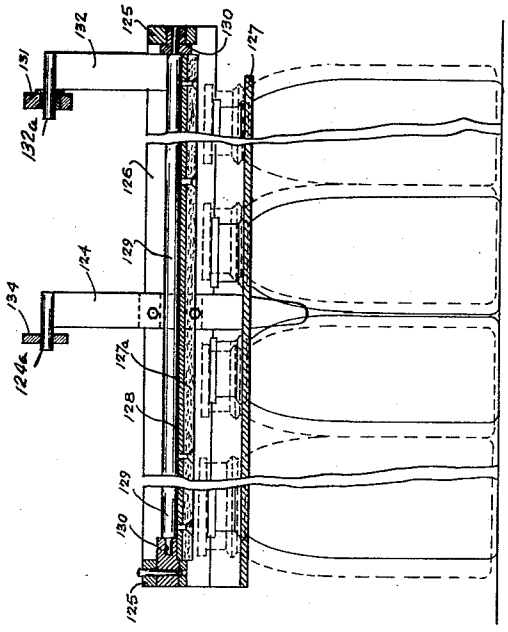


Fig. 5

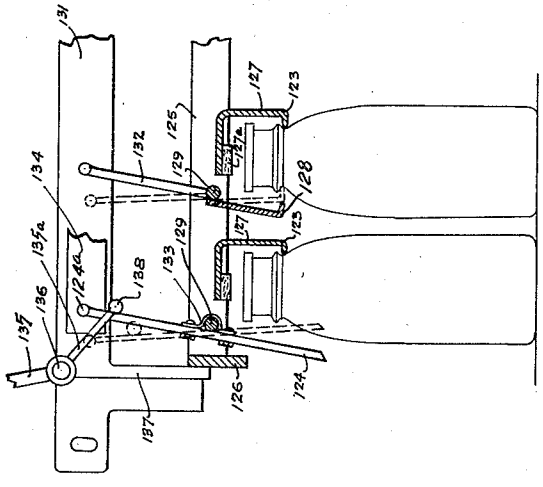


Fig. 4

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AUTOMATIC CASE FILLING MACHINE

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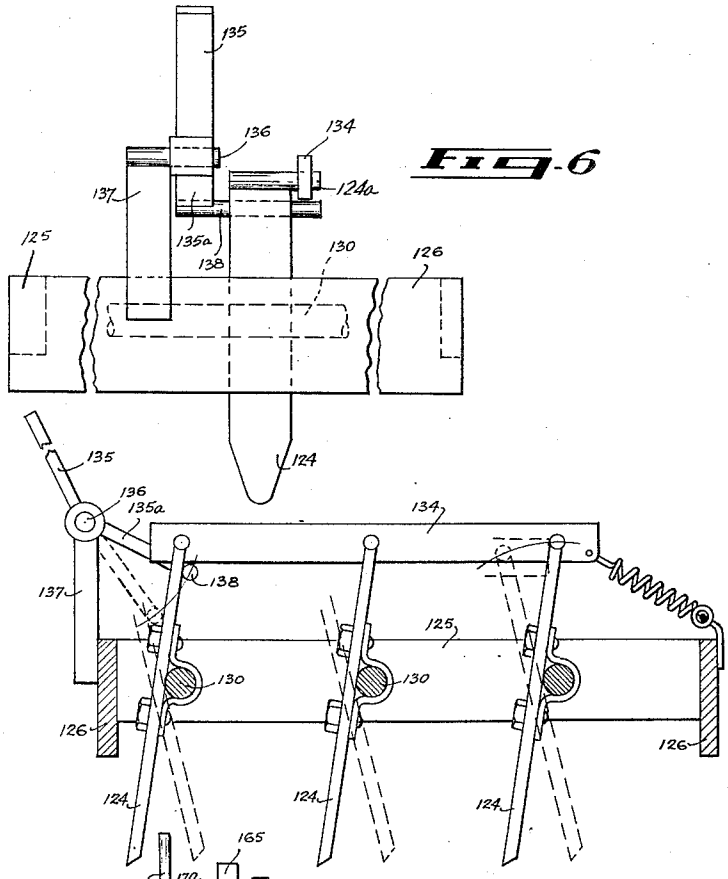


Fig. 6

Fig. 7

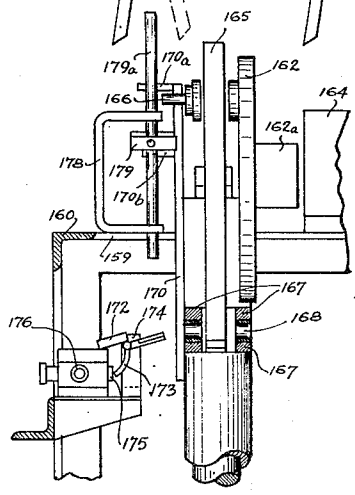


Fig. 9

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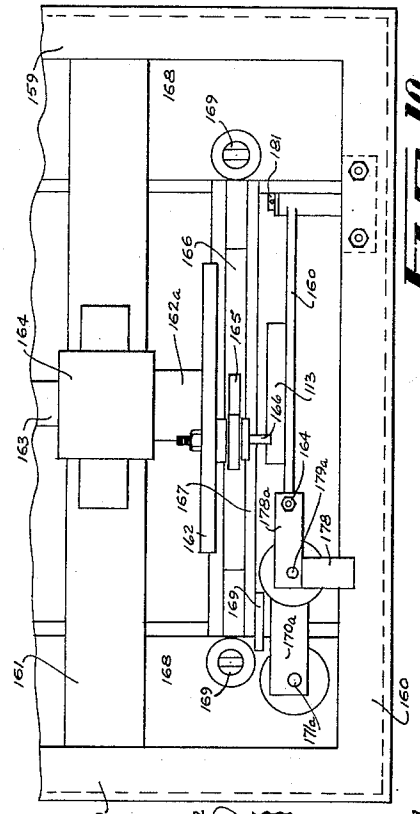


Fig. 10

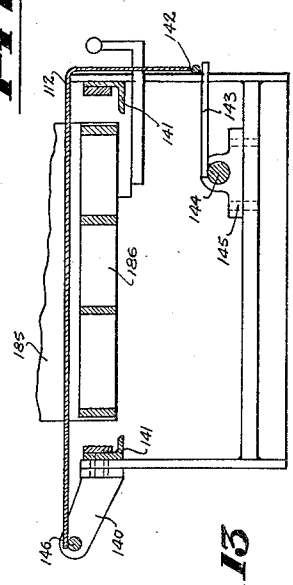


Fig. 13

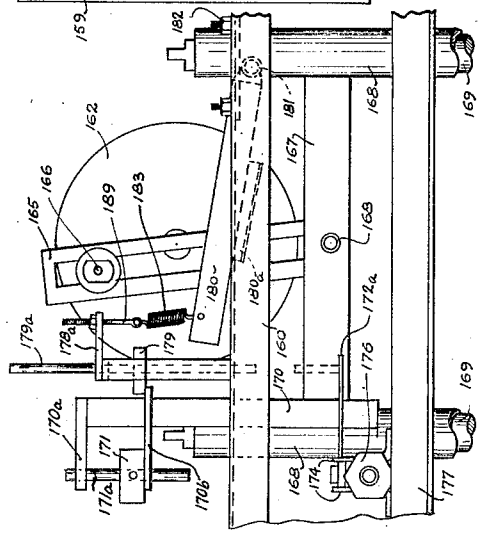


Fig. 8

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AUTOMATIC CASE FILLING MACHINE

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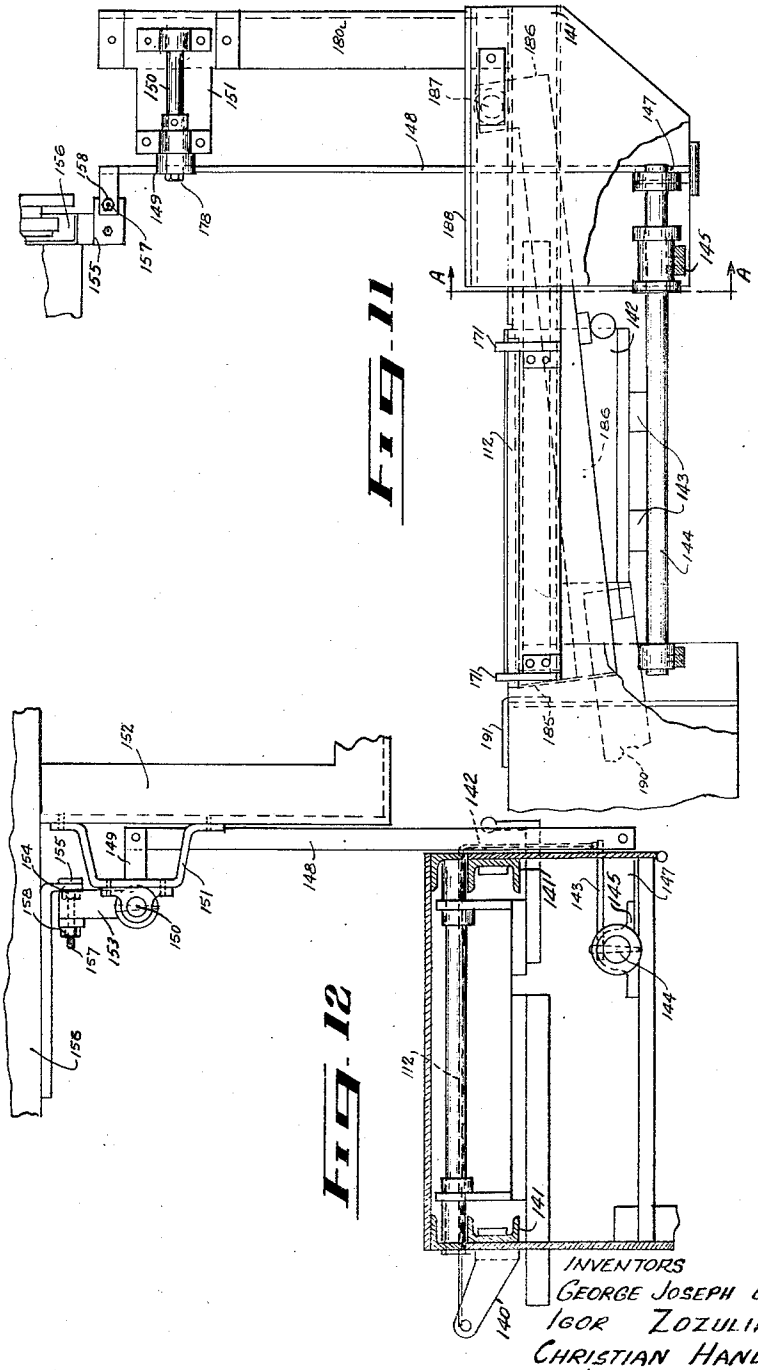


Fig. 11

Fig. 12

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AUTOMATIC CASE FILLING MACHINE

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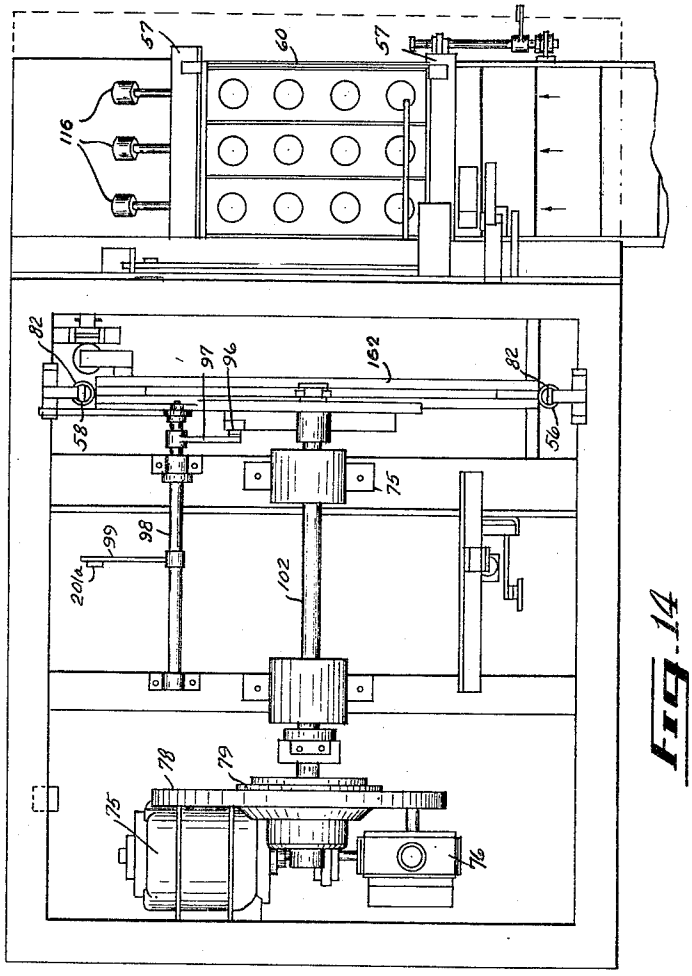


Fig. 14

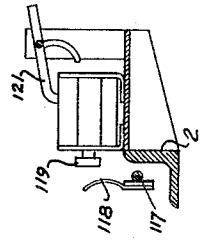


Fig. 15

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AUTOMATIC CASE FILLING MACHINE

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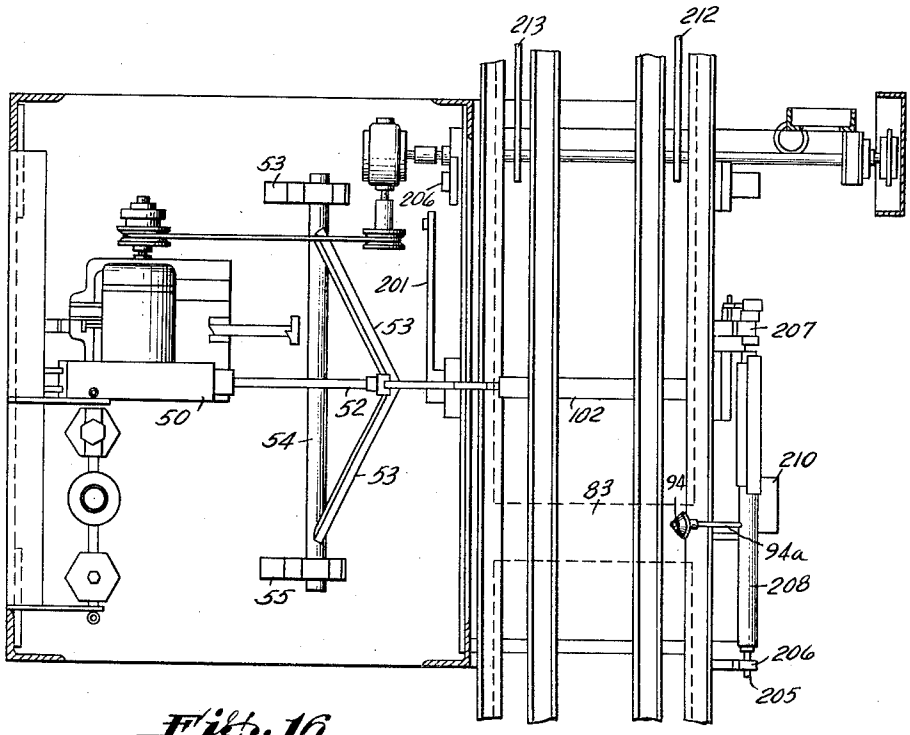


Fig. 16

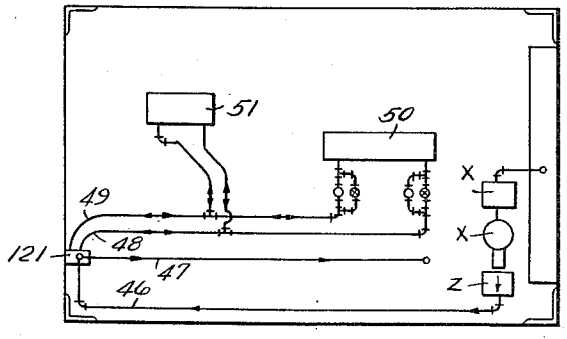


Fig. 17

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AUTOMATIC CASE FILLING MACHINE

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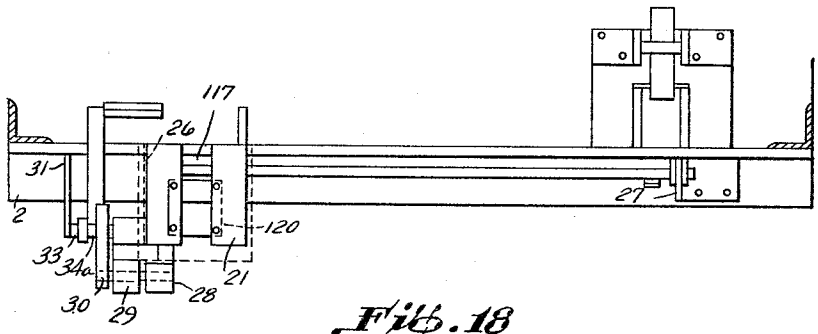


Fig. 18

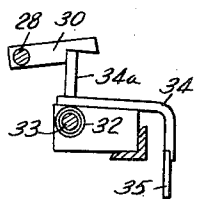


Fig. 19

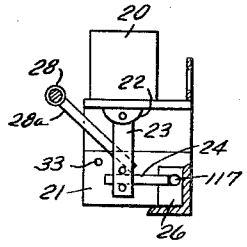


Fig. 20

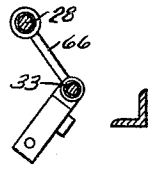


Fig. 21

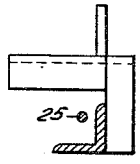


Fig. 22

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AUTOMATIC CASE FILLING MACHINE

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Fig. 23

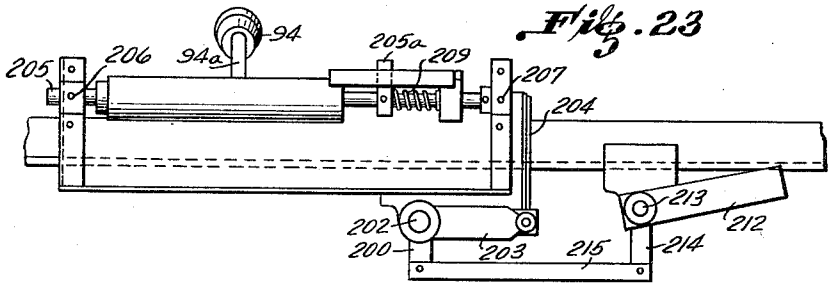
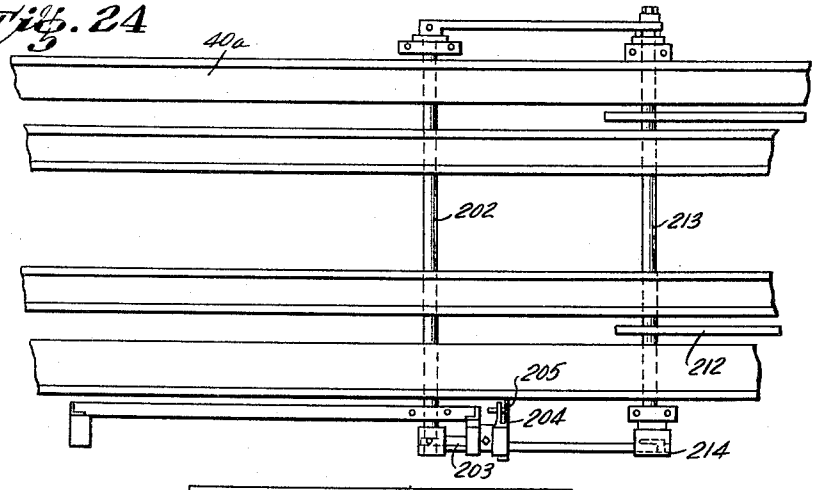


Fig. 24



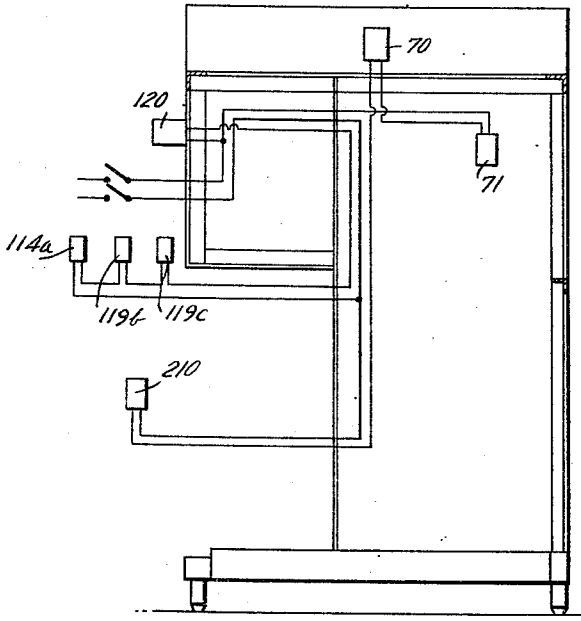


Fig. 25

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United States Patent Office 2,823,946
Patented Feb. 18, 1958

2,823,946

AUTOMATIC CASE FILLING MACHINE

George Joseph Okulitch and Igor Zozulin, Vancouver, British Columbia, and Christian Handberg and George Falck, Toronto, Ontario, Canada

Application October 7, 1952, Serial No. 313,432

Claims priority, application Canada August 19, 1952

2 Claims. (Cl. 294—87.2)

This invention relates to improvements in a machine for filling cases with containers, and particularly to improvements in a machine for placing bottles and like containers into open-topped cross partitioned cases or boxes for transportation.

The invention has as its chief object the provision of an improved operating mechanism for a machine as described by our co-pending United States application, Serial Number 301,542, now abandoned. In order to explain clearly the orientation and the operation of the various mechanisms and their relation to the other mechanisms and the machine as a whole it will be necessary to describe somewhat more of the machine than is intended to be a part of this invention. The inventive concept and the ambit of protection will, however, be clearly set forth and limited by the appended claims.

Briefly, according to the invention, containers which have been filled in a previous operation are delivered. The containers are carried in one or more rows to a loading station. The travel of the containers is interrupted by a stop means, extending across the conveyor, which is engaged by the bottles or containers. These means may stop the conveyor but in the embodiment described the conveyor moves continuously sliding beneath the containers after they are stopped.

Extending over the accumulating conveyor is a loading head carried by the outer end of a horizontally slidable carriage. The stop mechanism stops the bottles beneath the loading head and after a predetermined number are positioned there a switch is actuated which energizes an electromagnet which trips a link mechanism which causes a gate to close separating the bottles beneath the loading head from the bottles on the conveyor.

The aforesaid electromagnet also actuates an air valve to admit air to an air cylinder mounted on the carriage to close gripping members on the loading head around the necks of the bottles or containers and securely grip them. The electromagnet also admits air, through another air valve, to an air cylinder connected by a lever arm to the inner end of the carriage. The lever retracts the carriage from its position above the conveyor, carrying with it the containers to a position within the frame of the machine.

The carriage is slidably mounted on guides or rails which are in turn mounted on an elevator which slides on vertical posts. The retraction of the carriage actuates a switch which energizes an electromagnet which actuates a clutch which causes a motor to rotate a crank disk one revolution. The elevator is supported by a connecting link to a crank pin on the crank disc and one revolution of the disc allows the elevator to drop. On the descent, at a point near the most downward position a switch is tripped which causes air to flow into an air cylinder in the reverse direction from the previous time to release the bottles. The bottles are released in an open-topped, cross-partitioned case which has previously been supplied by a conveyor of a type similar to the bottle accumulating conveyor but which is located vertically

beneath the elevator and lies parallel to the bottle conveyor. The elevator then ascends again. The loading head is moved out over the accumulating conveyor, the gate opens and the bottles arrive to commence the cycle over once more.

This is briefly the mode of operation of the machine upon which these improvements have been made. Many details have been left out and have been left out intentionally as no purpose could be served by including them. In describing the individual mechanisms and improvements thereon the matter will be dealt with in sufficient detail to enable a clear understanding of the inadequacies of the old machine and the advantages of the new.

The improvements to this machine which embody the invention relate particularly to the loading head and bottle gripping mechanism and to the loading table which lies beneath the loading head when the bottles are being gripped. The invention resides in the provision of spreading fingers which pivot to take up positions between the containers to spread them laterally to enable them to clear the partitions in the case to which they are being transferred.

At the same time as the loading head is moving laterally with respect to the loading table, the loading table is allowed to drop slightly to eliminate friction between the bottoms of the containers and the table.

It will be convenient to define the drawings in which:

Figure 1 is a front view of the machine with the canopy that encloses the loading head removed.

Figure 2 is a side view of Figure 1 with the conveyors in section looking from the right hand side of Figure 1.

Figure 3 is a similar view from the left of Figure 1.

Figure 4 is a transverse section through the loading head.

Figure 5 is a longitudinal section of Figure 6 partly broken away.

Figure 6 is a fragmentary rear view of the loading head showing the separating members but omitting the bottle clamping members for the sake of clarity; and

Figure 7 is a transverse section of the loading head omitting the bottle clamping members and other details and showing the separating members.

Figure 8 is a front view of the case filler showing the essential parts of the elevating mechanism for the filler head.

Figure 9 is a fragmentary section of Figure 8,

Figure 10 is a top plan view of Figure 8.

Figure 11 is a front view of the loading table and part of the frame of the machine.

Figure 12 is a sectional view taken on line A—A in Figure 11.

Figure 13 is a section taken on line A—A of Figure 11 with some parts removed for clarity.

Figure 14 is a top plan view with the cover removed.

Figure 15 is a detail of the control valve.

Figure 16 is a section on the line C—C of Figure 3.

Figure 17 is a diagram of the hydraulic circuit.

Figure 18 is a view on the line D—D of Figure 3.

Figures 19, 20, 21 and 22 are detail views of some of the parts.

Figures 23 and 24 are detail views of the case stopping mechanism.

Figure 25 is a wiring diagram.

Loading table and loading head

Let us first consider the bottles as they enter the machine on the accumulating conveyor. The accumulating conveyor, per se, is a standard conveyor comprising endless sprocket chains passing around sprocket wheels one of which is positively driven. Flat flights or slats are provided on the chains to support the containers. Motive power for the conveyor is provided by the motor

101 mounted on the frame and is connected to the conveyor by gear train 102, shaft 103, sprocket 104, chain 105 to sprocket 106, shaft 107 and conveyor sprockets 108, 108, 108. These sprockets 108 carry chains 109 which carry flights or slats 109*a*, 109*a*, 109*a*, which slide on bars 110, 110, 110, 110. This arrangement of parts may be seen in Figure 2.

The accumulating conveyor may be as long as is necessary and at the end remote from shaft 107 are provided idler sprockets to receive the three chains 109. However, these sprockets are not shown in the drawing.

In the embodiment described, the accumulating conveyor extends only as far as the stationary loading platform. From this point to the container stopping mechanism, the loading platform extends, consisting of a solid metal plate 112. The containers are carried along the conveyor and pushed on to the plate by the container succeeding it.

Extending along each side of the accumulating conveyor and supported on a frame member are vertical guides 11, one on each side. It will be observed that the accumulating conveyor is intended to carry three containers across the conveyor which may be fed in by other suitable conveyors. As the bottles arrive on the conveyor they are pushed onto the loading table 112 by the bottles behind them on the conveyor. In Figure 1 the loading table is shown as 112 and extends from the right hand end of member 111 to the switch actuating member 113. Figure 3 illustrates the loading table 112 with a bottle resting thereon. The neck of the bottle is shown inserted in the loading head shown generally here as L. H. In other views the various parts will be given reference characters. Referring back to Figure 1 there are three switch actuating members 113*a*, 113*b*, 113*c*. These levers 113*a*, 113*b*, 113*c* are pivotally mounted on the shaft 115 which extends between brackets 16 and 17, and rods 18 having adjustable weights 116 on their ends extend at an angle to the levers 113*a*, 113*b*, 113*c* and tend to swing them forwardly to the position shown in full lines in Figure 1. Members 113*a*, 113*b* and 113*c* are located behind lever 113, these members being shown in Figure 2. When the bottles are pushed onto the loading table by the bottles on the conveyor the arms 113*a*—*b* and *c* remain undisturbed until four bottles have arrived. The fourth bottle pushes the first three and the first bottle moves arms 113*a*, 113*b*, 113*c* to the position shown in dotted lines in Figure 1. If all three switches 114*a*—114*b* and 114*c* which are located behind levers 113 are actuated by arms 113*a*—*b* and *c* an electric circuit is completed and an electromagnet is energized. As will be seen from Figure 25, these switches 114 are located in a circuit which will energize an electromagnet 120 which in turn acts to close a pair of gates behind the group of containers which are to be loaded and to start in operation the loading mechanism. The electromagnet shown at 120 in Figure 1 causes the rotation of shaft 117 hence member 118 and thereby actuates valve plunger 119 and valve 121. This admits air to an air cylinder 200 as will be described below and closes the gripping jaws on the loading head and secures the bottles. The partial rotation of shaft 117 also causes a cam shaft to move and through a lever linkage raises the gate 122 (see Figure 3) after the fourth bottle to prevent further bottles from entering the machine until the loading head has returned empty to the position above the loading table. As soon as the bottles have been carried away by the loading head weights 116 cause arms 113*a*, 113*b*, 113*c* to pivot about point 115 and return to the full line position in Figure 1.

The gate valve and gate operating mechanism are shown more fully in Figures 1, 3 and 18 to 22. Figures 18 to 22 include a number of details not clearly shown in the other views. The electromagnet 120 as clearly seen in Figure 1 is mounted on a U-shaped bracket 21 on the front bracket 2 which bracket 21 as seen in Figure 1 is L-shaped in cross-section. A solenoid plunger 22 (see Figures 1 and 20) is actuated by the electromagnet 120. In Figure 1 the solenoid plunger is shown as extended outwardly, whereas in Figure 20 it is shown as retracted. The plunger 22 is connected (Figure 20) to a link 23 which is pivoted to lever 24 secured to shaft 117. When the electromagnet 120 is energized, the solenoid plunger will be forced upwardly and will thus rock the shaft 117 which extends longitudinally of the front bracket and is journalled in bearing brackets 26 and 27 at opposite ends of said front bracket.

When shaft 117 is rocked the lever 24 engages a lever 28*a* (see Figure 20) which is pinned to a shaft 28 which is pivotally mounted on an arm 29 which is rotatably mounted on shaft 33 (Figure 3) on which spring lever 34 is also rotatably mounted. Shaft 33 is a fixed shaft extending between one arm of the brackets 21 and a bracket 31. A lug 34*a* projects from spring arm 34 and is adapted to engage a shoulder on pawl 30 which is secured to shaft 28.

Rotation of the shaft 117 lifts lever 28*a*, rotates shaft 28 and lifts pawl 30 out of engagement with lug 34*a*. Spring 36 shown in Figure 1 is connected to the front bracket 2 at one end and to connecting rod 35 at the other end and normally exerts an upward pressure on the connecting rod which is restrained by engagement of lug 34*a* with pawl 30. However, when pawl 30 has been lifted the spring raises the connecting rod 35 and under guidance of link 36 best shown in Figure 3, rotates through pin 35*a* a pair of connecting levers 37 which are mounted on fixed pivots 37*a* and are pivoted at 37*b* to gate 122. This causes the conveyor gate to close, that is to say, to move upwardly from its retracted position and to extend horizontally between the containers on the conveyor belt and those containers on the stationary platform beneath the loading head.

A connecting rod 39*a* is pivotally connected to an arm 113 on lever shaft 115 (see Figure 1). This connecting rod extends through an aperture in lug 40 and is provided with a shoulder which provides a catch to prevent levers 113*a*, 113*b*, 113*c* from being pushed back by the bottles beyond a predetermined distance. When the gates are closed the connecting rod 39 is engaged by one of the levers 37 and raised so that the shoulder comes out of contact with the lug 40 permitting the connecting rod to move longitudinally and thus permitting the levers 113*a*, 113*b*, 113*c* to move backward allowing the containers to spread slightly, thus facilitating engaging them and lifting them off the conveyor as hereafter described.

Assuming that the carriage is in outer position with the loading head over the containers, when the containers have actuated the switches 114*a*, 114*b* and 114*c* the actuation of the carriage is affected in the following manner.

As shown in Figures 1, 2, 15 and 17 air valve 121 is mounted on the front bracket 2. Rotation of shaft 117 by the electromagnet causes air valve lever 118 to swing toward the air valve and engage sliding valve 119. Connected to this air valve 121 as shown in Figure 17 is an air line 46 for conveying air from a compressor (not shown) through an air filter X, air reducing valve gauge Y and lubricator Z which are shown diagrammatically in Figure 17 and also in Figure 16 at the rear of the machine. An exhaust line 47 also extends from the valve 121 and two air lines 48 and 49 go to air cylinders hereafter described. Actuation of the button 119 of the air valve actuates the air valve in a known manner to cause air to pass through the air lines 48 and 49. Details of the air valve are not shown since they are standard.

The air line 48 travels to one end of air cylinder 50 for operating the loading carriage and simultaneously to one end of the air cylinder 200 for operating the means for holding and releasing the containers (Figure 3). Air cylinder 50 is pivoted at one end to a rear frame

member and its piston **52** is pivoted to the carriage operating lever **53** (Figures 2, 3 and 16). As is apparent from Figure 16, the carriage operating lever **53** comprises two arms secured to a transverse shaft **54** journalled in bearings **55** and secured to the apex of the arm is a connecting rod **53***a* having a longitudinal slot therein, through which passes a pin **59** secured to a lug **56** on the loading carriage **57**.

The loading carriage is mounted for horizontal sliding movement on an elevator generally designed by the reference numeral **58**. The loading carriage **57** comprises U-shaped members **57***a*, **57***b* connected at their inward end by a platform **57***c*. The elevator comprises horizontal frame members **58***a* and **58***b* on which are mounted a plurality of rollers **59** entering into carriage frame members **57***a* and **57***b* to slidably support the carriage (see Figure 1).

The carriage operating lever moves the loading carriage to its forward full line position in Figures 2 and 3 from the dotted line position shown in those figures. In the forward position the loading carriage is located above the accumulating conveyor and over the containers which have accumulated thereon as already described.

The loading head generally designed by the reference number **60** is detachably secured to the forward end of the loading carriage by depending bracket **60***a* (Figure 2) at front and rear at each side and is adapted to clamp and lift the containers from the conveyor. The clamping and lifting mechanism is actuated by the air cylinder **200** which as already described is controlled by the air valve **43**. The air cylinder **200** is shown in Figures 1 and 3 mounted on the underside of the loading carriage **57**. The loading head is best shown in Figures 3, 4 and 5 from which it will be seen that the piston **200***a* is pivotally connected to a release bar **131** which extends transversely across the accumulating conveyor adjacent one end thereof.

Loading head

Referring now to Figures 4 and 5 a detailed description of the loading head will be given. The loading head comprises a box like frame comprising side members **125** and front and rear members **126**. Extending between the side members are the bottle clamping members comprising fixed members **127** and swingable members **128**. The fixed members are substantially L-shaped with an inwardly curved lip **123** adapted to engage an annular protuberance or flange on the neck of a bottle as seen particularly in Figure 4. The ends of this member are rigidly secured to the side frames **125**, **125**. Secured to the upper horizontal portion of each fixed clamping member is a rubber strip **127A** to protect the top of a bottle in case the bottom of the bottle should meet an obstruction while being lowered into the case and be forced upward into contact with the top of the fixed clamping member.

The swingable clamping members **128** comprises substantially flat plates, each having an inturned lip adapted to engage the neck of a bottle opposite the corresponding lip on the fixed member **127**. The swingable clamping members are secured to a shaft **129** which shaft is journalled in bearings **130** in the side members **125**, **125**.

The swingable clamping members are operated by a lever **132** adjacent one side member **125** at one side of the loading head. In Figure 5 one of these levers **132** is shown. The member **128** and the lever which operates it is omitted from the left side of this view to avoid confusion with the divider member which is there illustrated. Similarly on the right side of the view the divider member is omitted for the sake of clarity.

There is one lever arm **132** for each member **128** and they are pivotally connected to transverse release and actuating bar **131** by means of stub shaft **132***a*. The inner end of bar **131** is connected to the piston rod of an air cylinder so that the clamping members are actuated to engage the top of the containers when they are on the loading platform and release the bottles when they are lowered into the case in the same manner.

The bottle dividing mechanism which is also mounted on the loading head comprises primarily a plurality of dividing members or dividers **124** comprising flat plates having pointed ends and pivotally mounted on shafts **129** by means of brackets or straps **133**. The movable jaws **128** are cut away at this point so that the dividing members are freely swingable on shafts **129**. Assuming that the loading table accommodates 12 bottles in three rows of four there will be nine dividers **124**. When these dividers are swung inwardly as shown in Figure 5 their tapered ends will engage the shoulders of adjacent milk bottles and spread them out to the position indicated in dotted lines in Figure 5.

Swinging movement is imparted to the dividers **124** by means of an actuating bar **134** for each of the sets of three dividers. The upper ends of the dividers **124** are pivoted to the bar **134** by means of a stub shaft **124***a* on each of the levers **124**. This can be seen in Figure 8.

The means for actuating the divider mechanism is illustrated in Figures 4 and 7 of the drawings and comprises a vertical strut member **137** secured to the rear member **126** of the loading head. Pivoted to the upper end of member **137** is an angular lever **135**. The pivot point is at **136** and the lever has two arms **135** and **135***a*. The arm **135** extends upwardly from the loading head and the arm **135***a* extends into the jaw mechanism of the loading head. Lever arm **135***a* is provided with a stub shaft **138**, at right angles thereto which engages arm **124** (see Figure 6). After the bottles are in position and the gripping jaws have closed, the carriage moves to the left in Figure 7 and the arm **135** comes in contact with a suitable stop member **135***b* mounted on the frame. This stop member follows the vertical path of the loading head (see Figure 2). As the carriage continues to move to the left the arm **135** is forced to pivot to the position shown in dotted lines in Figure 7 causing the dividing members **124** to spread the bottles as shown in dotted lines in Figure 5. The action of arm **135***a* on the first spacer arm **124** is transmitted to the other spacer arms by means of connecting arm **134**. Arm **134** is a bar extending across the loading head in a direction at right angles to the bottom gripping jaws.

It was found in previous machines that when the carriage moved to position the charge of bottles over the empty case, the friction between the bottles and the loading table was sufficient to cause some difficulty of movement. This was increased when the spacer arms **124** spread the bottles and caused them to assume a position at an angle from the vertical so that one edge of the bottom of the bottle was lower than before. To overcome this difficulty a loading table was provided which could be dropped a small distance and thereby allow the bottles to be suspended in the air by the loading head.

The mechanism involved in the dropping of the table will now be described.

Loading table

Referring to Figures 11, 12 and 13 it will be seen that the loading table is shown at **112** and is pivoted at its outer side to brackets **140**. It extends across the conveyor slightly above and substantially parallel to frame members **141**. The inner side of the table **112** which projects downwardly inside the frame is shown as **142**. The portion **142** rests on fingers **143**, **143** which extend inwardly from rotatable shaft **144** which is journalled in bearings **145** beneath the loading table.

It will be observed that by rotating the shaft **144** clockwise the loading table will be able to pivot about point **146** (see Figure 13) on bracket **140** by reason of the dropping of fingers **143**. To cause this to occur when the bottles are being moved inwardly from the table **112** by the loading carriage, the following mechanism is pro-

vided. Secured to the end of shaft **144** remote from the bottle feed conveyor is a lever arm **147** (Figures 11 and 12). Pivotally connected to this lever arm is a link **148** which is pivotally attached at its other end to another lever arm **149**, secured to shaft **150**, secured to bracket **151** on frame member **152** of the machine.

Also secured to shaft **150** is another lever arm **153** having a striker member **154** secured thereto in the path of a striker member **155** depending from the reciprocating carriage which carries the loading head and which is identified in Figures 11 and 12 by the reference numeral **156**.

When the carriage moves to the left in Figure 12 coming from depositing bottles in a case the striker plate **155** strikes member **154** forcing it to move to the left. This moves lever **149** upwardly and this upward motion is transmitted to lever **147** and fingers **143** by link arm **148**. This lifts the loading table **112** to the position shown in Figure 13. After the bottles have arrived and have been gripped by the jaws mounted on carriage **156**, said carriage **156** moves inwardly or to the right in Figure 12. There is then no support for striker **154** and it is moved by the weight of table **112** through the lever linkage described above and allows the table **112** to drop to clear the bottles held by the loading head. The striker member **154** comprises a bolt **157** threaded through a hole in arm **153**. A lock nut **158** is provided to hold it securely. It will be seen that the length of travel of arm **154** and hence the distance of drop of table **112** can be varied by screwing the bolt either in or out of arm **154**.

When the loading carriage reaches its outermost position roller lever **66** engages cam surface **67** on the loading carriage as shown particularly in Figure 3. Lever **66** is pivotally mounted on shaft **33**, as is also the arm **29** which carries shaft **28**. The raising of roller lever **66** swings arm **34** downward (clockwise in Figure 19) and allows pawl **30** to reengage lug **34***a*. This forces down the gate connecting rod **35** against the pressure of spring **36**, thus opening gate **38** and permitting the containers to travel along the accumulating conveyor to engage the stop member and actuate the electromagnet **120** as heretofore described and rotate shaft **117** substantially simultaneously to close the gate and actuate the container clamping mechanism and the carriage operating mechanism. Rotation of the shaft **117** swings the air valve lever **44** into contact with the valve button **45** thus causing the air to flow through the line **48** and **49** to the ends of air cylinders **50** and **200**. This causes the container clamping means to clamp the containers and the carriage to withdraw carrying the loading head and the container with it.

When the containers are removed the switch levers **113***a*, **113***b*, **113***c* swing out, breaking the contact of switches **114***a*, **114***b*, **114***c* and thus de-energizing the electromagnet **120**. As the loading carriage is withdrawn switch operating lug **67***a*, having an inclined face engages switch operating lever **68** actuating switch operating rod **69** (see Figure 3) thus operating switch **70** which energizes electromagnet **71** connected to clutch lever **72** which operates clutch **73** in disc rotating shaft **163**. Shaft **74** is driven by motor **75** through a speed reducer **76**, pulley **77**, belt **78** and pulley **79** secured to said shaft **74** (see Figures 2, 3 and 14).

Mounted on the forward end of the shaft **74** is a crank disc **162** having a pin **166** extending from the periphery thereof to which is connected the sliding connecting rod **82** having a longitudinal slot therein. The lower end of the connecting rod **82** is pivoted to a transverse member on the elevator **58** and supports the elevator when the crank pin **166** is in the uppermost position. However, actuation of the clutch in the manner before described causes the motor **75** to rotate the crank disc **162** causing the elevator **58** to drop. Elevator **58** is slidably mounted on two vertical rods **227** on which the elevator will slide to the lowermost position shown in dotted lines in the figures carrying with it the loading carriage and the loading head (see Figure 2). A case **83** has been carried by the case conveyor hereafter to be described to a position beneath the loading head and the containers are loaded into the case which is shown in dotted lines in Figures 1, 2 and 3.

As shown in Figure 2, pivotally mounted on the rear or inward end of the elevator frame **58***b* is bell crank safety lever **84** having a weighted catch **85** adapted to engage a lug **86** on the loading carriage **57** when it is retracted to prevent it from accidentally moving forward when the elevator **58** is not in its uppermost position.

A curved bar **87** is secured to a frame member and when the elevator reaches its uppermost position the lever **84** engages the curved or cam surface of said bar and is tilted back raising catch **85** out of contact with lug **86** to permit the carriage to be moved forwardly or outwardly. However, when the elevator drops, lever **84** comes out of engagement with bar **87** and weighted catch **85** is free to drop into engagement with said lug **86** and prevent the carriage from moving forward while the elevator is descending to deposit the containers in the case and subsequently ascending to pick up another load of containers.

Release for bottle clamping means

In the previous description which is to be found in United States application Serial Number 301,542 (now abandoned) there has been described means for releasing the bottle clamping members when the loading head has deposited the bottles in the case. It has also been described how the bottles are not released should their bottoms strike an obstacle such as the edge of the case on their descent. Should this happen the loading head merely does not descend sufficiently to deposit the bottles in the case, but is lifted again by the elevator and returned to the loading platform. The bottle case is then moved on by its conveyor in an empty condition and a new case takes its place and the bottles are then deposited in the second case.

However, in some instances the bottles are dropped into the case but strike the dividers which form the bottle compartments of the case. With the previously described construction these bottles are not deposited but are lifted again and returned to the loading table. It has been found in practice that loading is considerably delayed if too many unfilled cases are carried to the discharge end of the case conveyor. On the other hand, if the bottles are regularly released from the loading head before they are deposited in the bottom of the case, there is a tendency for the bottles to break because of the considerable drop to which they are subjected. For the occasional time when a bottle or bottles strike the dividing members in the case it is not undesirable that they should be released since the danger of breakage is considerably less if the release occurs only occasionally before the bottle is deposited in the bottom of the case, and an operator at the discharge end of the case conveyor can quickly and easily push down to the bottom of the case the bottle or bottles which have been caught on the divider.

The purpose of the release mechanism to be described, is, therefore, to provide a means for releasing the clamping mechanism from the bottles for the occasional time when the bottles enter the bottle case but one or more of them is caught on a divider member of the case. The means for releasing the bottles when they have been deposited in the bottom of the case is not effected by this device.

Bottle release mechanism

In describing this mechanism reference will be had to Figures 8, 9 and 10.

At first a brief description with reference to the accompanying drawings will be made of the normal release mechanism followed by a descritpion of the secondary release.

Illustrated in Figure 10 are the essential frame mem-

bers of the machine consisting of side members **159, 159**, a front member **160** and a transverse member **161** extending between the side members **159, 159**.

The elevator actuating fly wheel **162** has a rearwardly extending hub **162***a* and is rotated by drive shaft **163** which is journalled in bearing **164** on frame member **161** extending between the side members **159**.

A slotted crank **165** is pivotally secured to crank pin **166** at one end and at the other end supports a reciprocating cross bar **167** (see Figure 8) by means of pin **168** which passes through the slot in the crank arm **165**.

The ends of the reciprocating cross bars **167** are secured to reciprocating sleeves **168** adapted to slide up and down on vertical guide rods **169** which are secured at top and bottom to the frame of the machine. On the lower part of the reciprocating sleeve **168** is mounted the elevator mechanism which carries the loading head and bottle spacer mechanism previously described.

The primary release for the clamping members of the loading head is operated by the following means. A vertical support **170** is secured to one end of the reciprocating cross bar **167**. A transverse plate **170***a* shown in Figures 10 and 12 is secured to the upper end of the support and another plate **170***b* is secured to support **170** below the upper plate **170***a*. A weight **171** is supported between the said two plates by means of a pin **171***a* which extends through holes in the upper and lower plates **170***a* and *b* respectively.

When the fly wheel **162** rotates, it permits the reciprocating cross bar **167** to drop carrying with with it the support **170** and the weight **171** until the bar **167** reaches substantially its lowest position, at which time the loading head has descended to substantially its lowest position carrying the milk bottles into the bottle case. At this point the lower end of rod **171***a* engages the striker **172** shown in Figures 10 and 11 (but omitted from Figure 10) which with its curved actuating arm **173** is pivoted to bracket **174**, whereby the curved actuating arm engages the plunger **175** of the air valve **176** which is secured to a front frame member **177**. Actuation of the plunger operates the air valve which in turn actuates means to release the bottle clamping members to release the bottles and deposit them in the case.

It will be noted that the means for releasing the bottles is not actuated until the reciprocating cross bars, carrying the elevator and loading head, have substantially reached the bottom of their up and down movement and the bottles are therefore deposited in the bottle case. Now will be described the means if the bottles are stopped before the loading head has descended far enough to deposit the bottles in the bottom of the case as, for instance, when a bottle comes into engagement with a cross partition of a case.

A bracket **178** (see Figure 9) of substantially U-shape is secured to the upper front frame member **160** and a weight **179** mounted on an axial pin **179***a* which extends through holes in the arm of the bracket **178** is supported by one edge on the lower plate **178***b* of the bracket **178**. Thus, when the bracket **170** is carried downward by the reciprocating cross arm **178**, the weight **179** is permitted to drop. However, the weight **179** can fall only as far as the pivoted operating lever **180** (see Figure 8) the end of which projects into the path of the said weight **179**. This operating lever is pivoted to the upper frame member **160** on a stub shaft **181** which is secured to and projects from a bracket **182** secured to the underneath part of the said upper front frame member **160**. The pivoted operating lever is resiliently and adjustably suspended from plate **178***a* which extends from the upper arm of the U-shaped bracket **178** by means of a spring **183** and an adjusting screw **184**.

Projecting inwardly from the pivoted operating lever **180** is a striking plate **180***a* which is adapted to be engaged by the outer end of the crank pin **166** as the fly wheel **162** rotates in an anti-clockwise direction (see Figure 8). When the crank pin engages the striking plate the pivoted operating lever is depressed against the spring **183** and this permits the weight **179** to drop until its pin **179***a* engages an extension **172***a* (Figure 8) of the valve striker **172** thus actuating the releasing mechanism to permit the bottles to drop into the case.

By adjusting the position of the pivoted operating lever **180** and the relative position of the pins **171***a* and **179***a* of the weights **171** and **179** respectively, the secondary releasing means can be adjusted or timed so that it will become effective when the bottles have passed a predetermined distance into the case, so that the device is applicable to cases having partitions of different heights. It will be understood that if the bottles strike, for instance, the top of a case the loader head will not drop any further. In that case the plate **170***b* which supports the secondary release weight **179** will not drop far enough to permit the weight **179** to rest on the operating lever **180**. However, the arrangement is such that if the lower plate **170***b* drops a predetermined distance below the end of the pivoted operating lever **180**, the weight **179** will rest on the operating lever. When the operating lever **180** is struck by the crank pin **166** and depressed, the weight **179** will drop and since its pin **179***a* is longer than the pin **171***a* of weight **171**, the lower end of the pin **179***a* will strike the striker of the release valve and actuate the release valve even though the loading head has not descended to the point where pin **171***a* of the weight **171** will actuate the release valve.

Of course, if the loading head descends its maximum distance, depositing the bottles in the case, the release valve will be actuated by weight **171** and subsequent engagement of the striker **172** by the pin **179***a* of the weight **179** will be ineffective.

We claim:

1. In a machine for placing containers in a case, a device for gripping the containers comprising a series of spaced, parallel, rigid jaw members, a series of spaced, parallel pivoted jaw members opposing said rigid members and pivoting towards or away from them, each series being aligned with the direction of delivery of the containers to the device, a set of downwardly extending tapered fingers pivoted on the same axis as the pivoted jaw members, said fingers adapted to pivot to take up a position between adjacent containers held in said gripping members, thereby forcing them apart laterally.

2. In a machine for placing containers in a case, a device for gripping the containers comprising a box frame having two side members and a front and rear member, a series of spaced, parallel rigid depending jaw members having inwardly turned flanges and a series of spaced parallel pivoted depending jaw members, each series being aligned with the direction of delivery of containers to the device, a series of vertical pivoted tapered fingers along each pivoted member, said fingers being pivoted on the same axis as the pivoted jaw member but independently therefrom, said fingers adapted upon movement of the box frame to pivot to a position between containers held in the gripping means, thereby causing them to be slightly separated, one from the other.

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