

Feb. 21, 1956

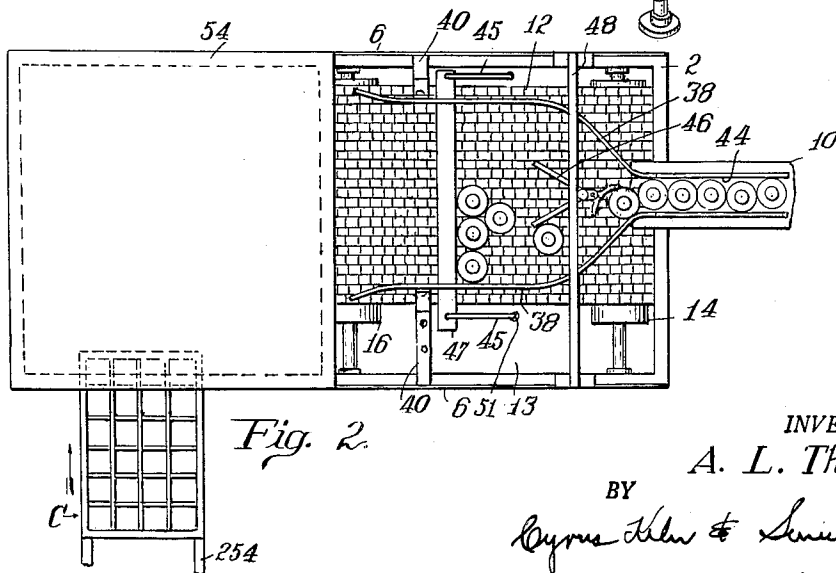
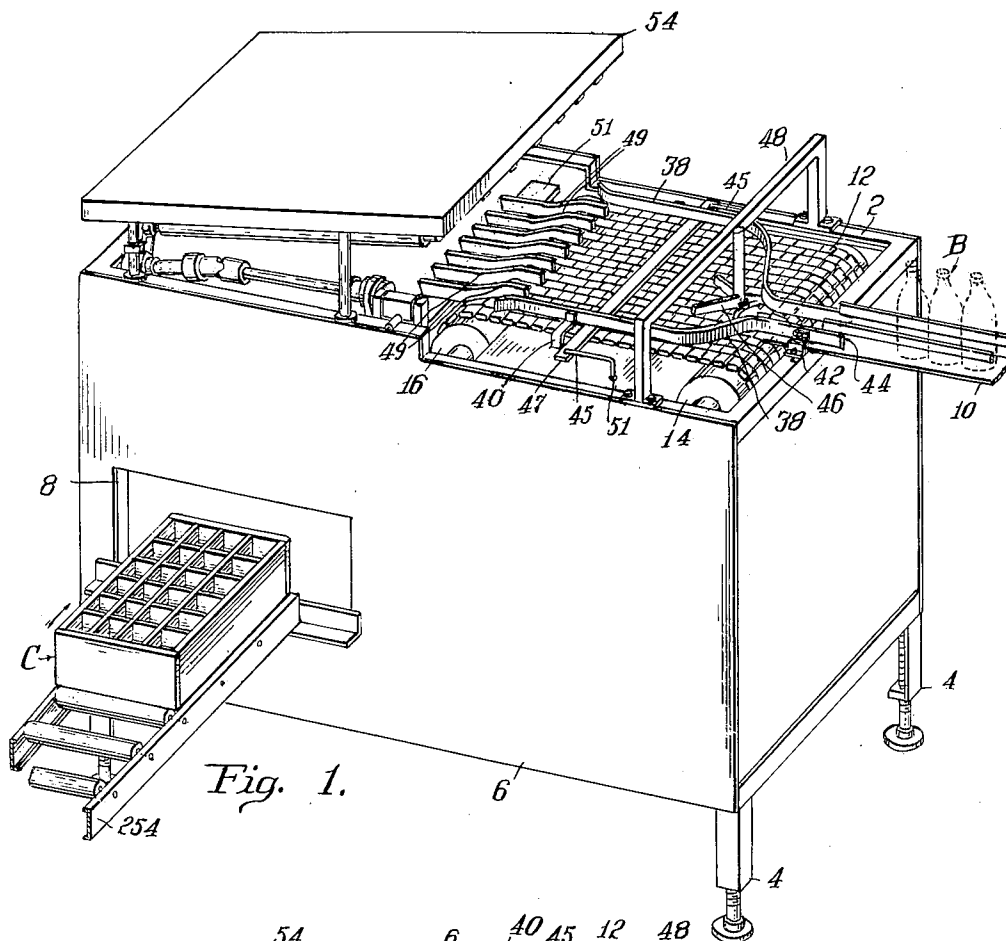
A. L. THURMAN

2,735,599

BOTTLE CASE FILLING MACHINE

Filed July 24, 1952

12 Sheets-Sheet 1



INVENTOR.

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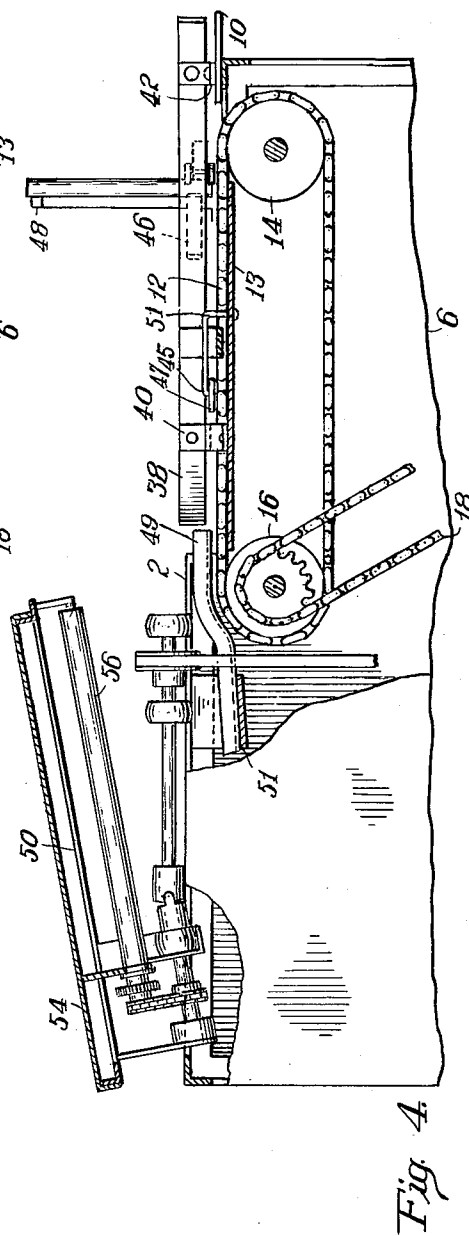
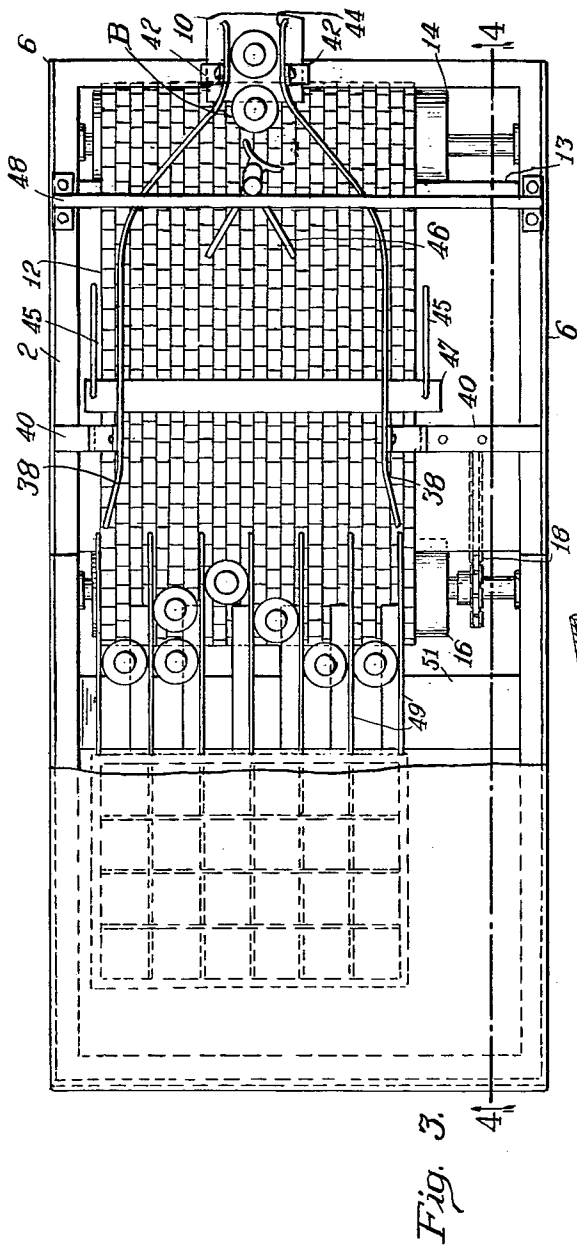
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BOTTLE CASE FILLING MACHINE

Filed July 24, 1952

12 Sheets-Sheet 2



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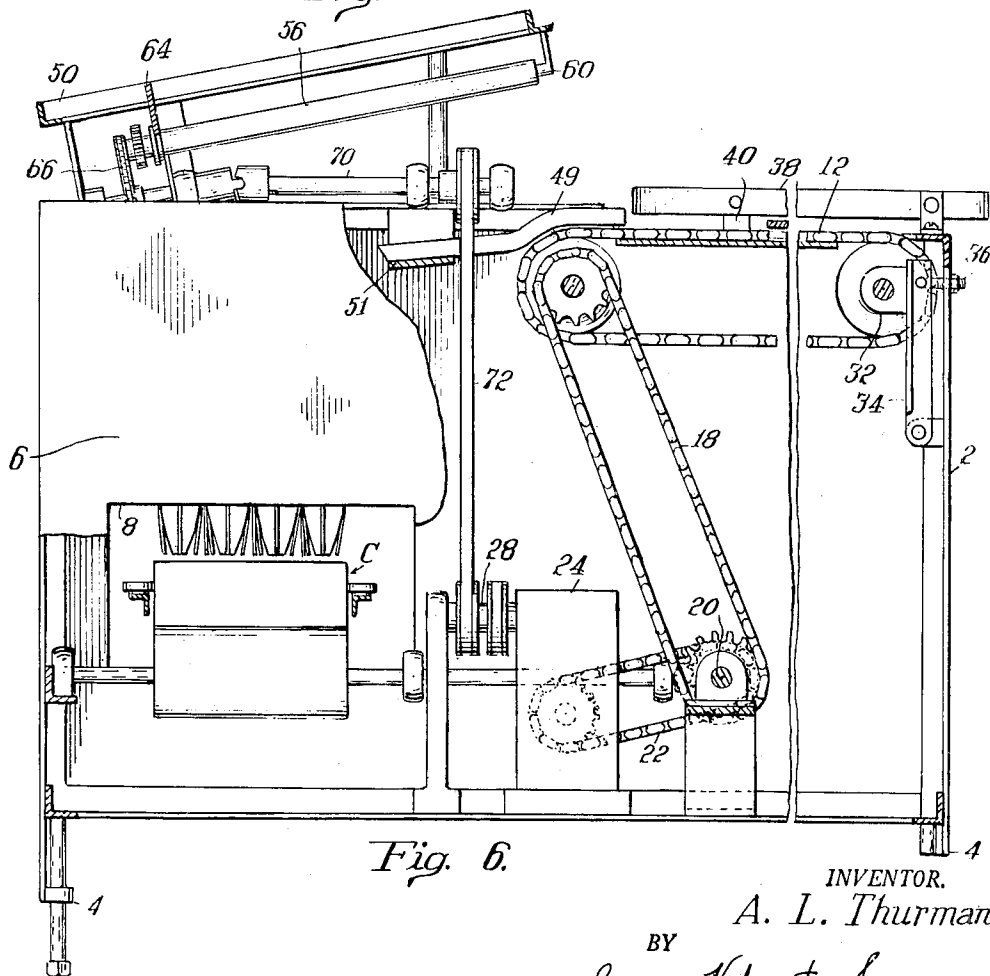
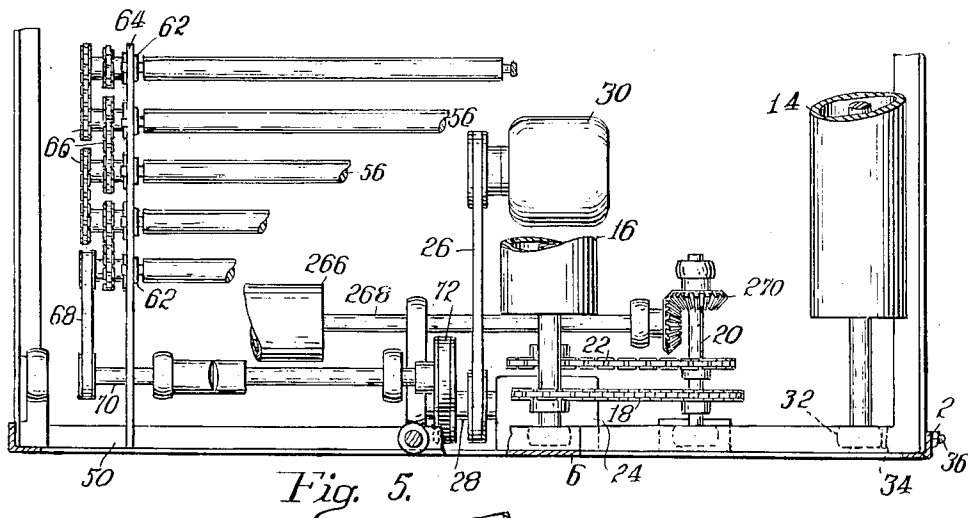
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BOTTLE CASE FILLING MACHINE

Filed July 24, 1952

12 Sheets--Sheet 3



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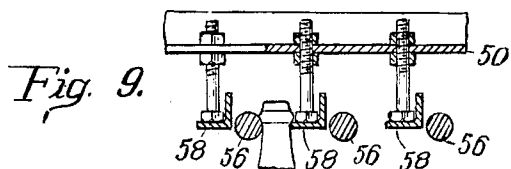
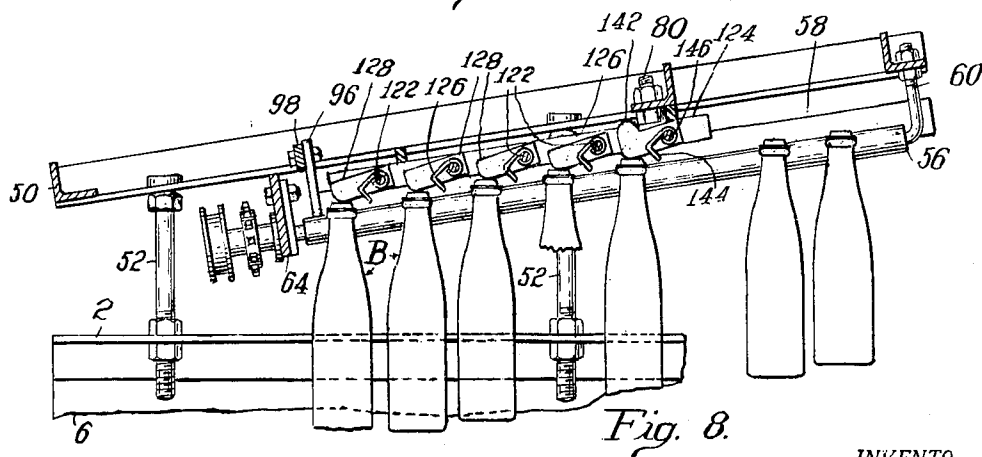
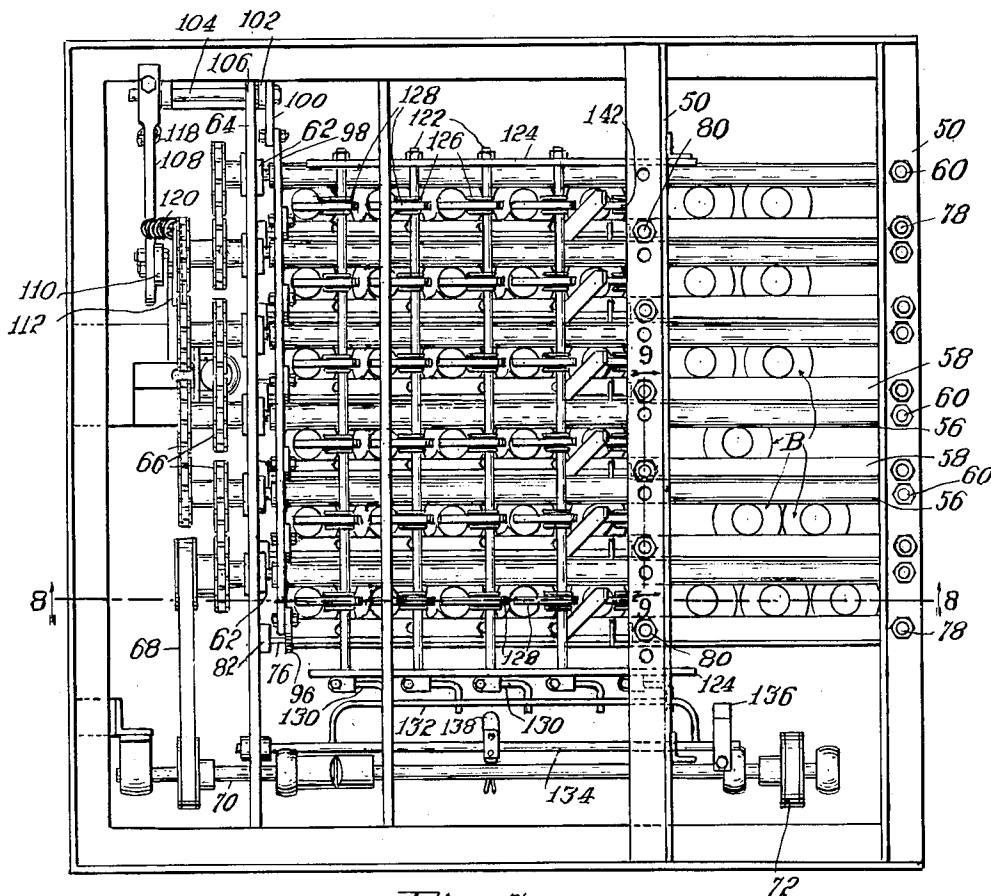
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BOTTLE CASE FILLING MACHINE

Filed July 24, 1952.

12 Sheets-Sheet 4



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BOTTLE CASE FILLING MACHINE

Filed July 24, 1952

12 Sheets-Sheet 5

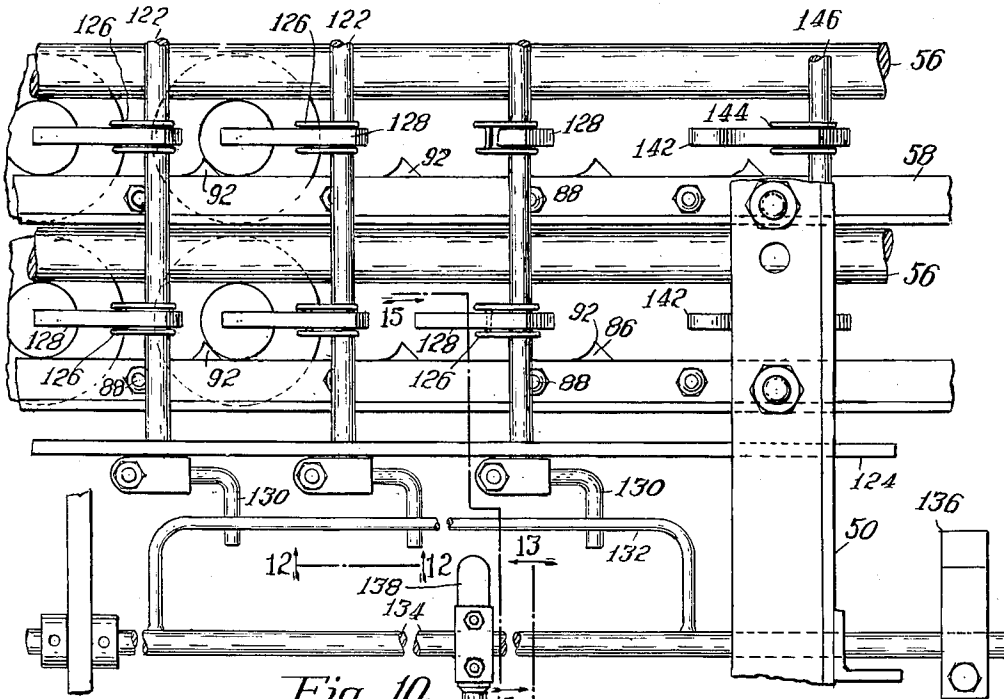


Fig. 10.

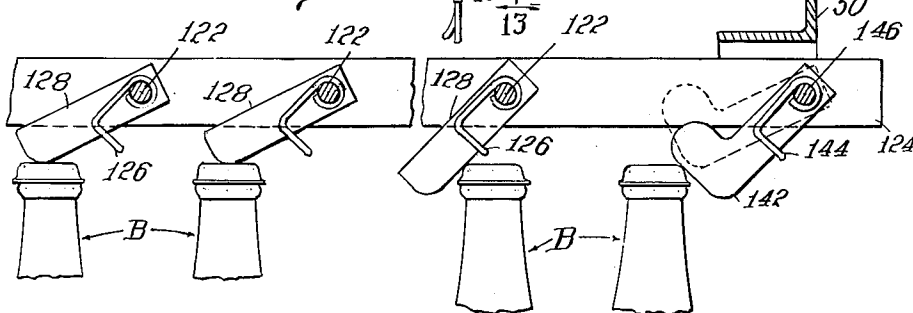


Fig. 11.

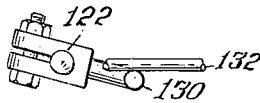


Fig. 12

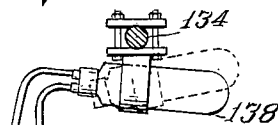


Fig. 13.

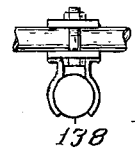


Fig. 14.

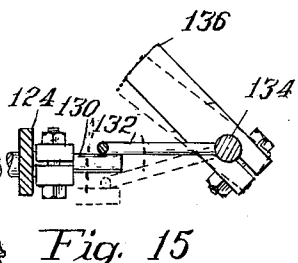


Fig. 15

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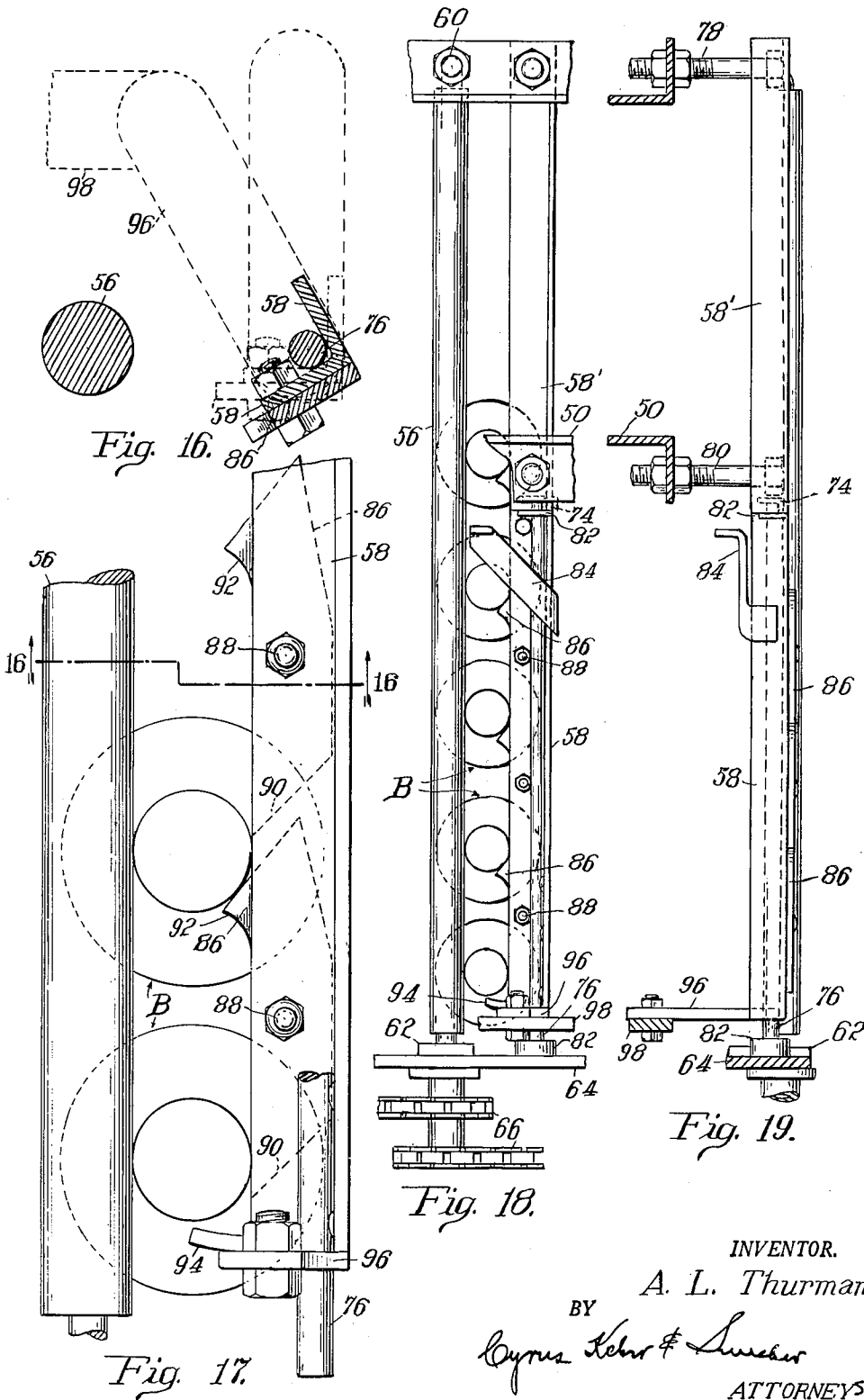
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BOTTLE CASE FILLING MACHINE

Filed July 24, 1952

12 Sheets-Sheet 6



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BOTTLE CASE FILLING MACHINE

Filed July 24, 1952

12 Sheets-Sheet 7

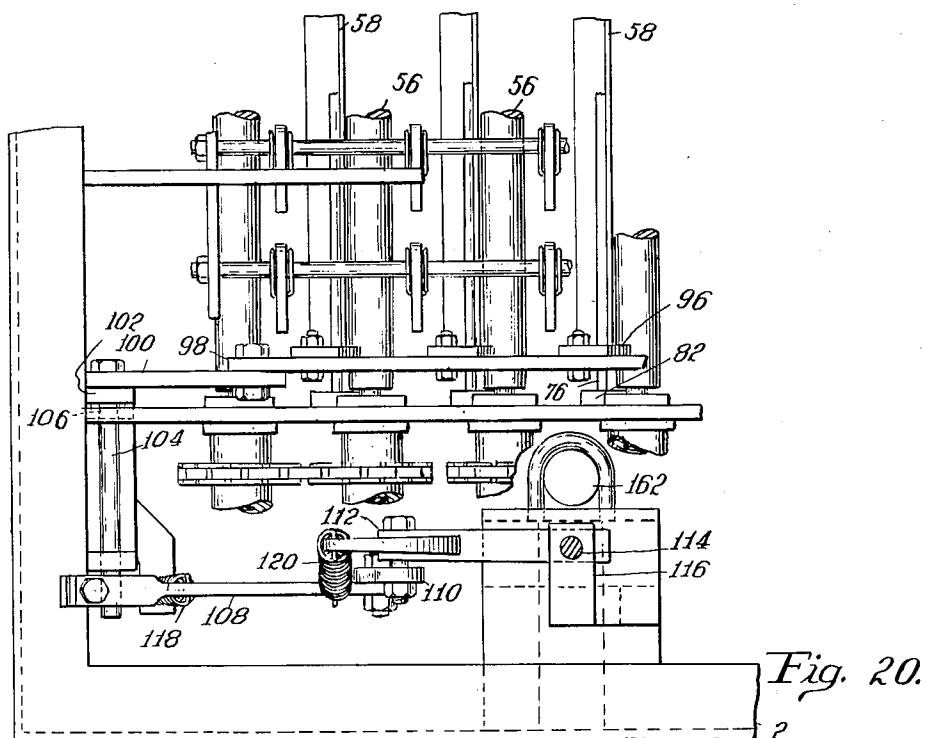


Fig. 20.

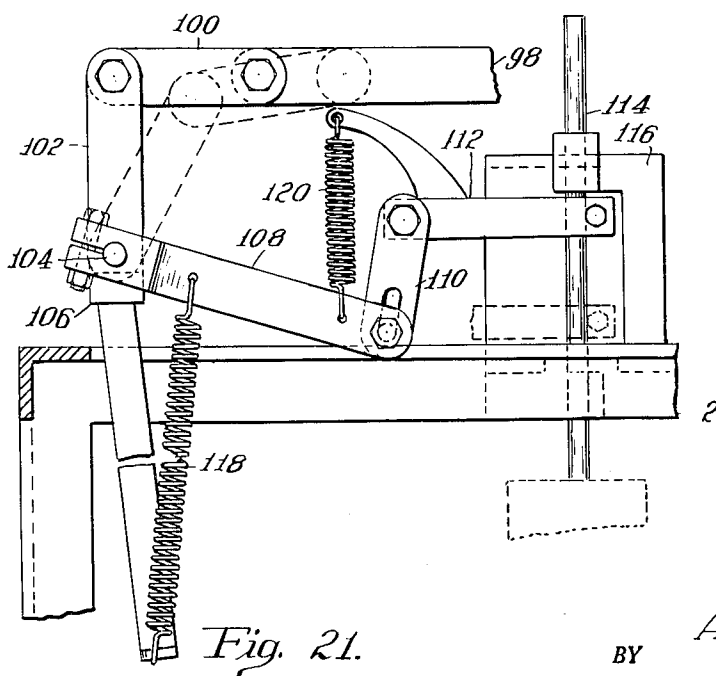


Fig. 21.

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BOTTLE CASE FILLING MACHINE

Filed July 24, 1952

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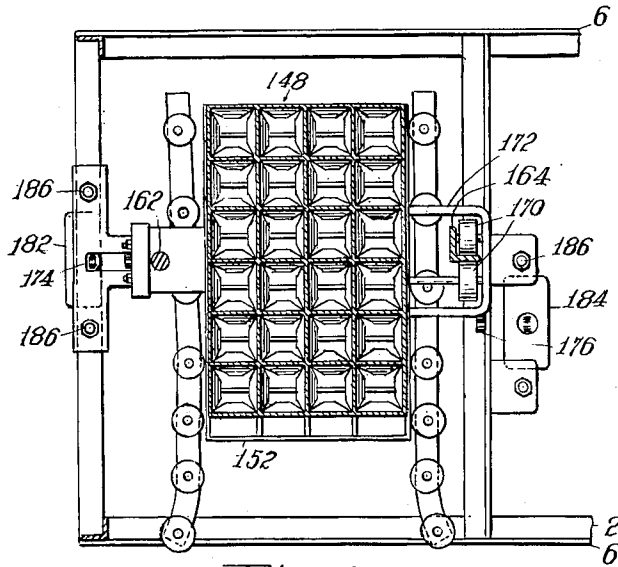


Fig. 22.

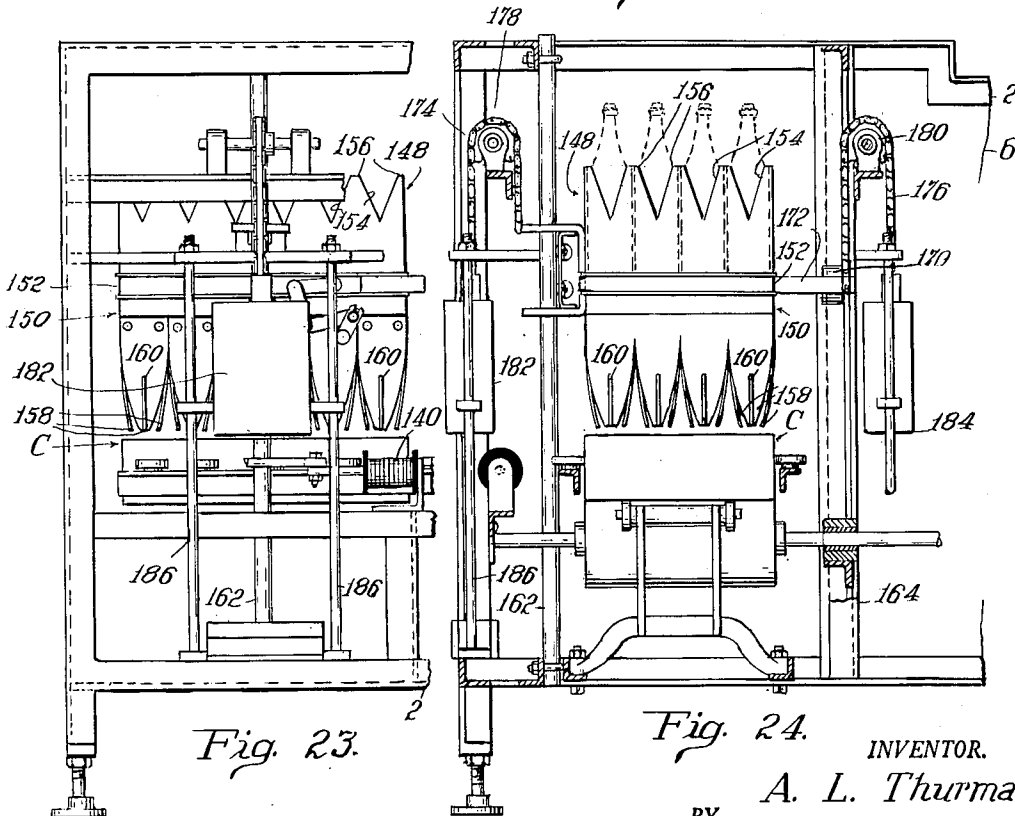


Fig. 23.

Fig. 24.

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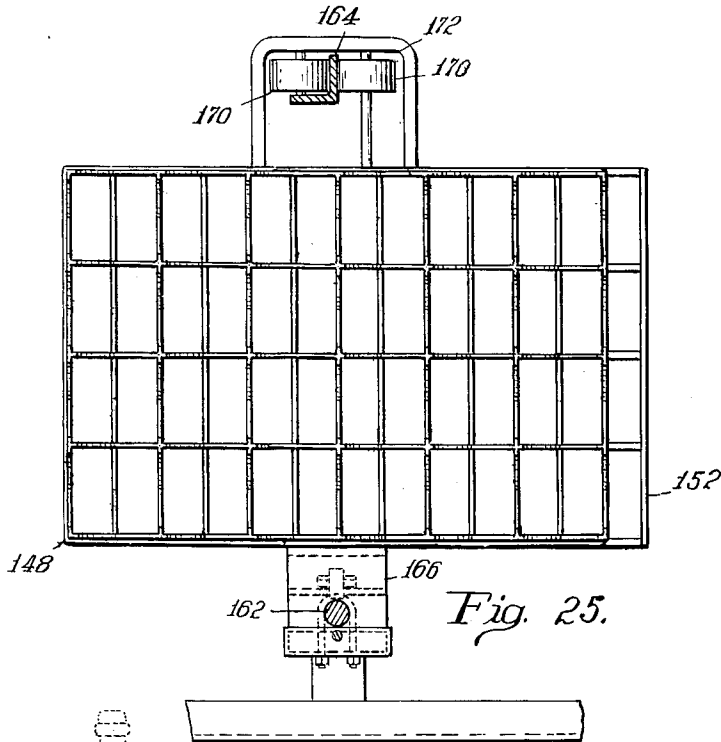


Fig. 25.

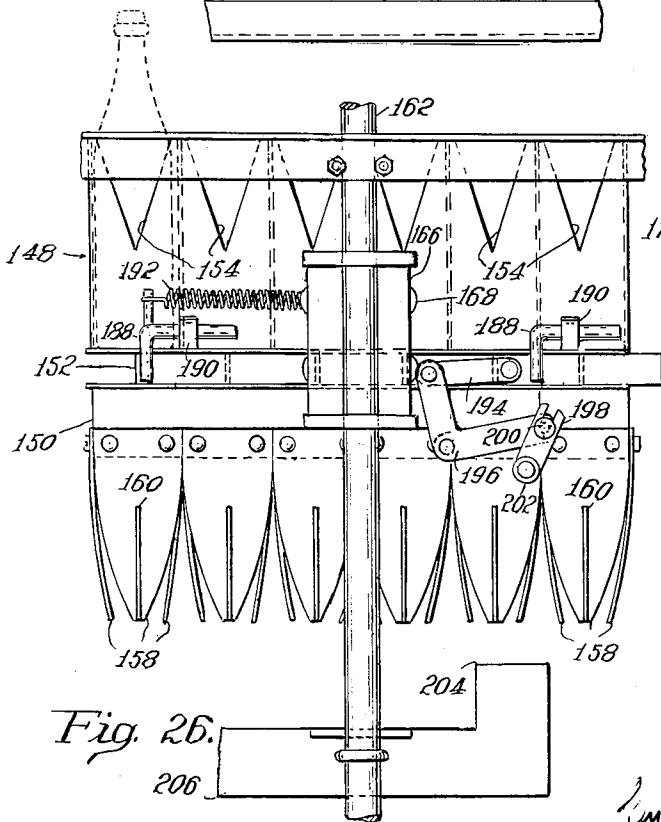


Fig. 26.

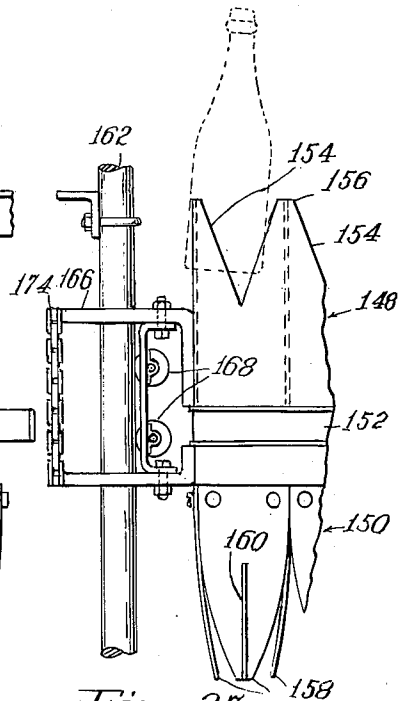


Fig. 27.

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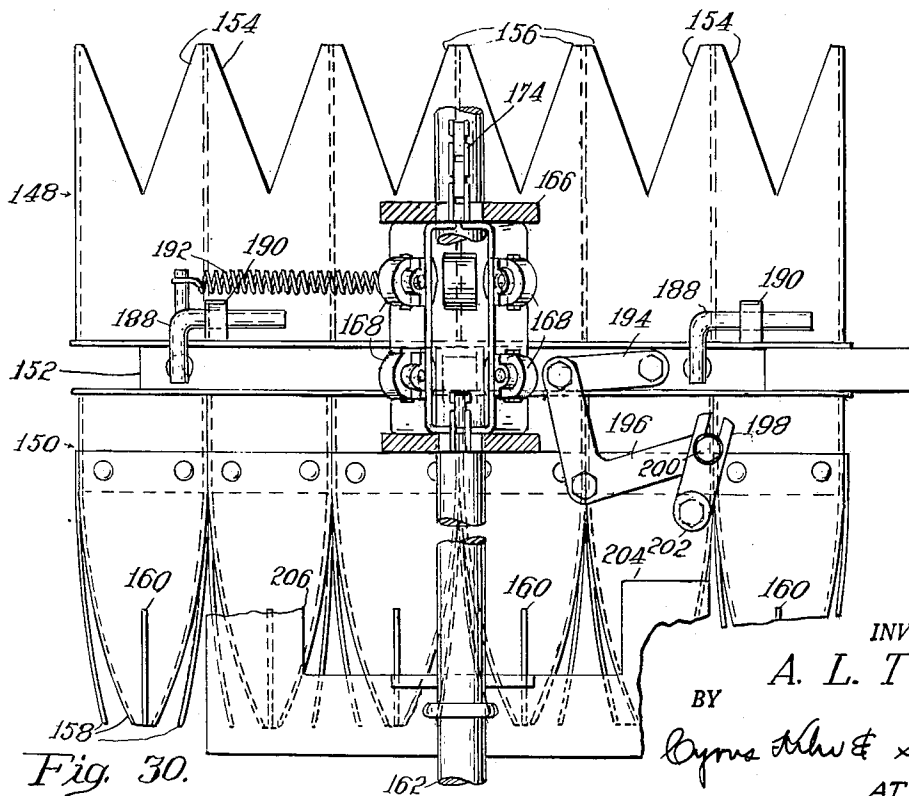
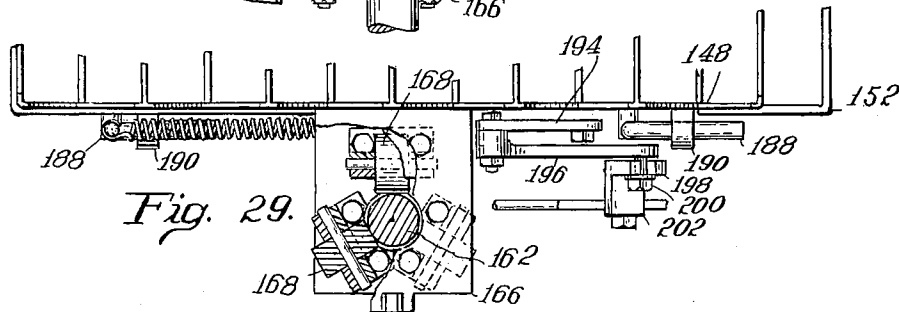
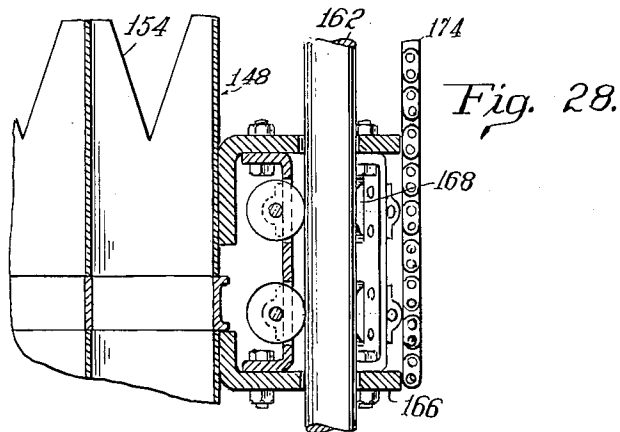
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BOTTLE CASE FILLING MACHINE

Filed July 24, 1952

12 Sheets-Sheet 10



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BOTTLE CASE FILLING MACHINE

Filed July 24, 1952

12 Sheets-Sheet 11

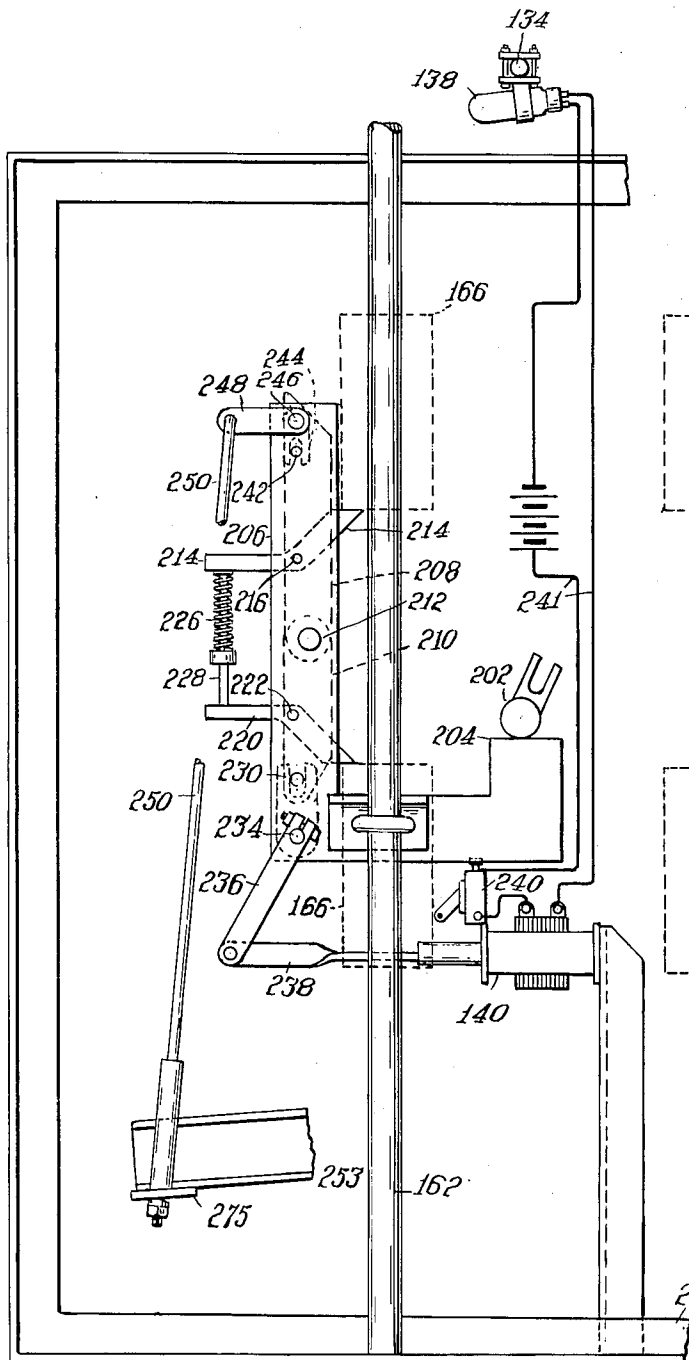


Fig. 31.

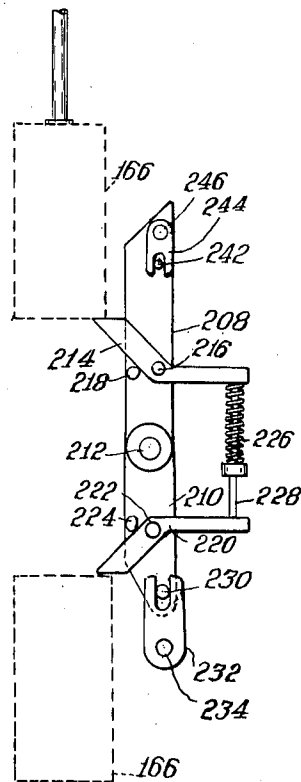


Fig. 32.

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BOTTLE CASE FILLING MACHINE

Filed July 24, 1952

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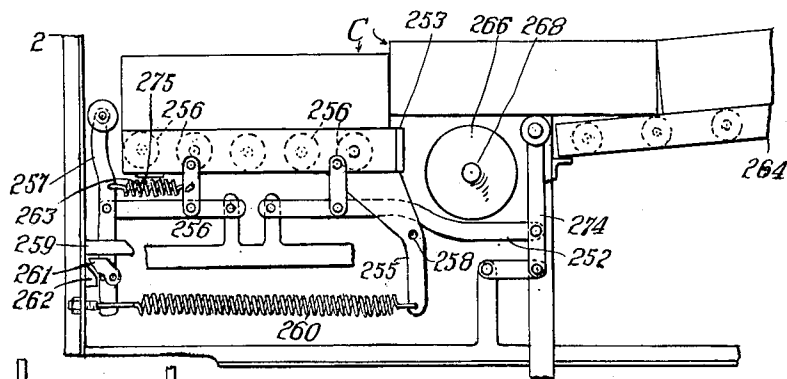


Fig. 33

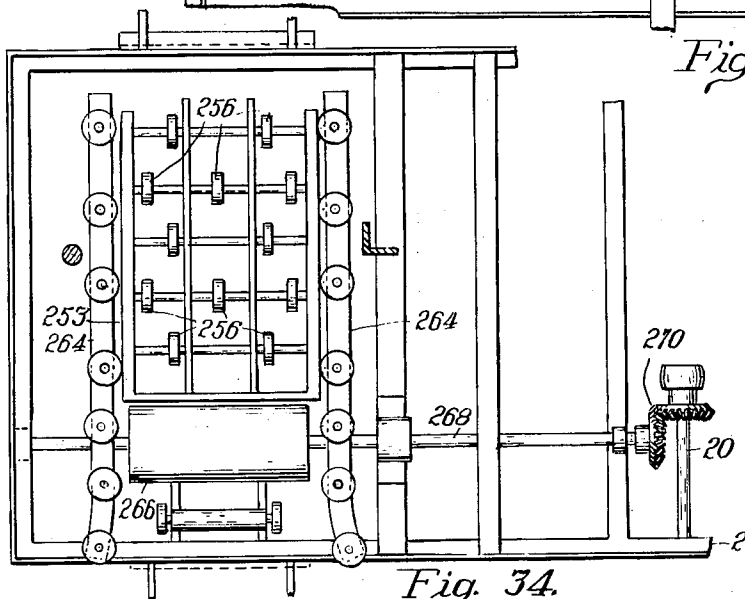


Fig. 34

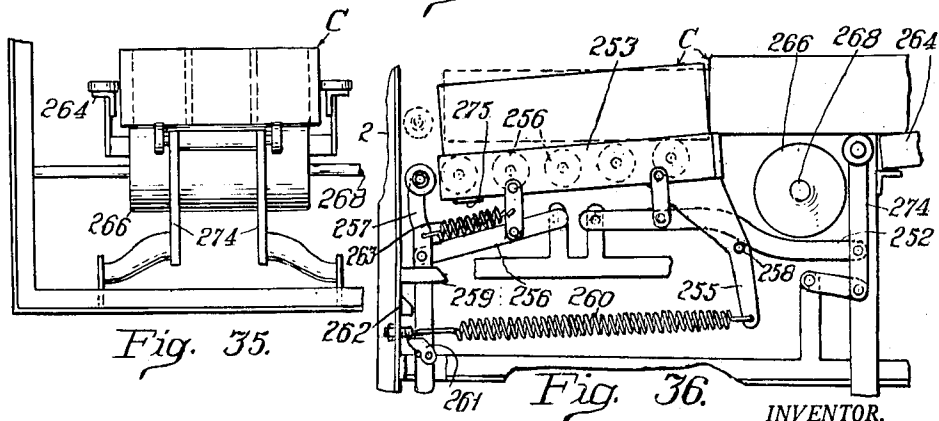


Fig. 35.

Fig. 36.

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2,735,599

BOTTLE CASE FILLING MACHINE

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Application July 24, 1952, Serial No. 300,608

33 Claims. (Cl. 226—14)

This invention relates to improvements in bottle case filling machines of the character adapted for placing filled beverage bottles in cases, cartons, etc.

As beverage bottles are filled and sealed by the capping machine, it is necessary that they be placed into cases or cartons for handling. While the bottles usually are discharged from the filling machine by a suitable conveyor, a more satisfactory machine is needed for inserting the bottles into the cases or cartons.

Wooden cases usually hold a total of twenty-four bottles. However, bottles often are placed in cardboard or paper cartons in lots of six or twelve. It is desired to fill the cartons or cases with the bottles as these are discharged from the bottle filling and capping machine.

One object of the invention is to improve the construction of case filling machines wherein the bottles will be separated into proper relation with each other for introduction into the case or carton to which they are to be supplied, and which machine will operate with a minimum of power required, and is relatively simple for the operation required.

Still another object of the invention is to insure that the required number of bottles are received in the machine in proper position for introduction into the case or carton before these are ejected to maintain the proper operation and functioning of the machine.

Another object of the invention is to receive the bottles in proper position for discharge and to support them in properly spaced relation by the necks thereof whereby these bottles will move uniformly through the machine and will be discharged properly therefrom for filling the receptacles.

These and other objects of the invention may be accomplished in a machine for filling cases and cartons with bottles that is power operated and substantially automatic and which works for long periods with little attention at a high rate of speed. It has provision for assembling a desired group of bottles, preferably twenty-four, according to the size of cases now customarily employed, which are carried into position by the necks thereof and properly spaced for insertion into the case.

Bottles can be received from one or more conveyor lines which are supplied to a flexible conveyor forming a gathering unit enclosed by guard rails on which the bottles are fed to the receiving unit of the machine. The gathering unit has provision for separating the bottles into respective rows which are fed successively to the receiving unit. The bottles enter the overhead powered rod bottle carriers and are carried by the necks thereof in suspended relation to points directly over the loading unit. The bottle carriers separate the bottles properly spaced from each other and have provision for insuring that the proper and desired number of bottles are received therein before discharge.

When the desired number of bottles are suspended in the receiving unit, a loading unit moves up automatically into receiving relation with the bottles therein. The loading unit preferably is so formed as to enclose the proper

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number of bottles to be introduced into the case or carton and its action is so timed with respect to the movement of the case or carton that the latter is moved into place beneath the loading unit automatically as the latter moves up into receiving relation with the bottles. When the empty case is in proper position, the loading unit is released to move down in the machine and deposits the charge of bottles in the empty case or carton. While this is being done, another charge of bottles moves into position above the loading unit and the latter may repeat its operation.

When the loading unit returns to its top position, the filled case is discharged from the machine and at the same time an empty case is positioned ready to receive another charge of bottles. In this way the machine has provision for affording a double action system by releasing a charge of bottles into an empty case while at the same time moving a new charge of bottles into the receiving unit ready to direct the same into the loading unit when it is moved up to a position in proper relation therewith.

The loading unit is not powered but is operated by gravity provided by the filled bottles themselves. Weights are used attached thereto to move the loading unit to its raised position and the filled bottles overbalance the weights to lower the loading unit and direct the bottles into the case or carton. The loading unit preferably is so constructed as to provide a minimum of breakage and to insure a proper direction of the bottles, both into the loading unit and therefrom into the case or carton, properly centered and spaced for direction into the latter.

This embodiment of the invention is illustrated in the accompanying drawings in which:

Fig. 1 is a perspective view of the bottle case filling machine embodying this invention;

Fig. 2 is a top plan view thereof;

Fig. 3 is a similar view on somewhat larger scale with a portion of the cover broken away;

Fig. 4 is a longitudinal section therethrough on the line 4—4 in Fig. 3, with portions in elevation;

Fig. 5 is a detailed top plan view of a portion of the drive mechanism;

Fig. 6 is an upright longitudinal section similar to Fig. 4 but showing other portions of the drive mechanism;

Fig. 7 is a top plan view of the receiving unit;

Fig. 8 is a longitudinal sectional view therethrough on the line 8—8 in Fig. 7;

Fig. 9 is a detailed cross section on the line 9—9 in Fig. 7;

Fig. 10 is an enlarged plan view of a portion of the feeder mechanism;

Fig. 11 is a longitudinal section therethrough;

Fig. 12 is a detailed side elevation of a portion thereof on the line 12—12 in Fig. 10;

Fig. 13 is a detailed cross section on the line 13—13 in Fig. 10;

Fig. 14 is a view at right angles thereto;

Fig. 15 is a detailed cross section on the line 15—15 in Fig. 10;

Fig. 16 is a cross section through a bottle holder on the line 16—16 in Fig. 17;

Fig. 17 is a top plan view thereof;

Fig. 18 is a similar view on a different scale;

Fig. 19 is a side elevation of the bottle holder at right angles to Fig. 18;

Fig. 20 is a detailed plan view of the bottle holder drive mechanism;

Fig. 21 is an end elevation thereof;

Fig. 22 is a horizontal section through the loading unit;

Fig. 23 is a side elevation thereof;

Fig. 24 is a similar view at right angles to Fig. 23, with parts in section;

Fig. 25 is a top plan view of the loading unit with parts of the structure omitted;

Fig. 26 is a side elevation thereof;

Fig. 27 is a similar view at right angles thereto;

Fig. 28 is a detailed vertical section through a guide for the loading unit;

Fig. 29 is a horizontal section therethrough;

Fig. 30 is an enlarged side elevation thereof;

Fig. 31 is a diagrammatic view of the control mechanism for the loading unit from one side;

Fig. 32 is a similar view from the opposite side;

Fig. 33 is a detailed side elevation showing the case support mechanism;

Fig. 34 is a top plan view thereof;

Fig. 35 is a view at right angles thereto; and

Fig. 36 is a view of the case support mechanism, similar to Fig. 33, with parts in discharge position.

The invention is illustrated as applied to a case filling machine, but in some of the drawings portions of the machine are omitted for clearness of illustration. To that extent the drawings are somewhat diagrammatic, although they will illustrate the structure of the machine fully and clearly.

In describing the operation of the machine, it will be understood that it is applicable not only for filling the usual wooden cases, but also for filling paper cartons of different sizes. In referring to the filling of cases, it will be understood that this has reference both to wooden cases and to paper cartons or carrying cases of the usual character.

The case filling machine comprising this invention is adapted to be used adjacent a bottle filling machine or machines and to receive the filled and capped bottles therefrom. The bottles ordinarily employed in connection with this invention are those customarily used for containing carbonated beverages. Such bottles ordinarily are provided with crown caps applied over a locking ring adjacent and spaced from a holding ring customarily formed on the neck of the bottle.

Fig. 1 shows the case filling machine with a row of bottles moving thereto along a chute from a bottle filling machine. However, it will be apparent that the machine may receive bottles from more than one filling machine, such as two machines, in which event two rows of bottles will be fed thereto.

The case filling machine includes a supporting frame structure, generally designated by the numeral 2 in Fig. 3, mounted upon supporting legs 4 (Fig. 1) at the corners of the machine. The parts may be enclosed, if desired, by one or more side plates 6, secured to the frame 2 and extending about the sides of the machine. The opposite side plates 6 are provided with openings 8 therein adapted for the passage of cases C into and through the machine, these being received through one side, as shown at the left in Fig. 1 and discharged through the opposite side.

Gathering unit

The bottle inlet end of the machine is provided with an endless conveyor 12, carried by drums 14 and 16, at the opposite ends thereof for the purpose of receiving the row or rows of bottles B from the chute or guideway 10.

This conveyor 12 is power driven, as shown in Figs. 5 and 6, by an endless chain or belt 18 extending over a drive wheel fixed to the shaft on which the drum 16 is mounted. The chain or belt 18 extends downwardly from the shaft of the drum 16 to a shaft 20, power driven by a chain or conveyor 22 extending thereto from a speed reducer drive unit 24. The speed reducer drive unit 24 is power driven in turn by a belt 26 extending over a shaft 28 connected with the speed reducer 24 and driven by a motor 30, as shown in Figs. 5 and 6.

The drum 14 is, in effect, an idler drum and provision may be made for adjusting the tension of the conveyor 12 by bodily movement of the drum 14. Accordingly, I have mounted the supporting shaft of the drum 14 in bearings

32 supported on pivoted arms 34, bodily adjustable lengthwise of the belt 18 by adjusting screws 36 threaded in suitable brackets in the frame 2, as shown in Fig. 6. Thus, by adjusting the screws 36, the arms 34 may be moved lengthwise of the frame to take up any slack in the conveyor 12 and thereby maintain the latter taut.

Any suitable conveyor may be used, as desired. However, I prefer to employ one formed of flexible chain links pivotally connected together in a mat of sufficient width to accommodate a plurality of rows of bottles. According to present practice, the bottles are packed customarily in wooden cases containing six rows of bottles with four in each row, a total of twenty-four bottles to the case. I have found that a chain-link conveyor of the type described, functions satisfactorily for collecting and spreading the bottles to the desired extent and for moving these forward in the machine to the loading position.

The gathering unit not only comprises the endless conveyor 12 but also means for dividing the bottles into multiple rows or distributing them transversely of the conveyor. Guard rails 38 are provided adjacent opposite sides of the conveyor 12, overlying the latter, and extending lengthwise thereof, as shown in Figs. 1 to 4. These guard rails 38 may be supported at their forward end portions by brackets 40 secured to a portion of the frame 2, and at their opposite ends on brackets 42, also supported on the frame 2. The guard rails 38 have their inlet ends brought into juxtaposition, as shown at the right in Fig. 3, to receive therebetween either a single row of bottles from one filling machine or two rows of bottles from two filling machines. According to this embodiment, only a single row of bottles B is supplied thereto, but these are spread laterally on the conveyor 12 into multiple rows, as described above.

The guideway or chute 44 is formed between the entrance ends of the guard rails 38 to receive the row or rows of bottles supplied thereto from the bottle filling machine or machines. This chute 44 is formed by a plate secured to the frame 2 of the machine and overlying the inlet end of the conveyor 12, between the guard rails 38, to direct the row or rows of bottles from the chute conveyor 10 onto the conveyor 12.

Provision may be made, if desired, for spreading the bottles fed forward on the receiving conveyor 12. If two rows of bottles are fed from separate filling machines, usually the spreading device will not be required. While any suitable spreading means may be used, as desired, I have illustrated a conventional spreader, generally at 46 in Fig. 3, which is supported by a yoke 48 extending over the receiving unit and mounted on the frame 2. This will separate and spread the mass of bottles fed forward by the receiving conveyor 12 transversely substantially throughout the area enclosed by the guard rails 38.

A support plate 13 is secured at opposite sides to the frame 2 of the machine to support the upper run of the conveyor 12. This supporting plate is shown in Figs. 4 and 6 and extends substantially between the drums 14 and 16, as illustrated therein.

Extending transversely over the conveyor 12 is a spreader plate 47 mounted on supports 45 at opposite ends thereof on the frame 2. The supports 45 may be in the form of spring arms to hold the plate 47 substantially on the top surface of the conveyor 12. As the bottles B are collected and moved forward by the conveyor 12, the bottles B are spread laterally by the plate 47 and the bottles are pushed over the plate in laterally spaced rows substantially across the width of the conveyor 12, and between spaced guides 49 supported on the main frame 2 of the machine. The guides 49 divide the bottles into rows. The guides 49 are held in spaced relation by a support 51 extending transversely of the frame 2 and mounted thereon and having the guides 49 secured to the said support.

Receiving unit

The gathering conveyor 12 discharges the bottles B in multiple rows to a receiving unit at the left hand side of the machine as viewed in Fig. 1. This unit comprises means adapted to receive and hold the bottles in multiple rows and properly spaced from each other for supply thereof to the loading unit, as hereinafter described.

The receiving unit comprises a supporting frame, generally indicated at 50 (see Figs. 6 and 7) which is mounted in turn on the main frame 2. Adjustable mountings are shown in Fig. 8 at 52 to vary the height of the frame 50 relative to the frame 2 to accommodate bottles of different capacities and for adjustment of the receiving unit relative to the loading unit where required for different sized bottles.

The frame 50 may be supplied with a cover 54, if desired, comprising a sheet extending thereover to enclose the receiving unit. This cover 54 is omitted in most of the drawings for clearness of illustration, and may be omitted in practice, if desired.

As pointed out above, the receiving unit is adapted to receive and hold a plurality of rows of bottles properly spaced from each other by the guides 49, and includes means carried by the frame 50 for accomplishing this result. Each holder (one for each row of bottles to be supplied to the case) is adapted to receive the necks of the bottles therebetween in a row, as will be apparent from Figs. 7 and 16 to 19.

Each bottle holder for a row of bottles comprises a roll 56 and a bar 58 in spaced parallel relation, as illustrated in Figs. 17 and 18. These members 56 and 58 coact to form supporting members for the bottles, which members are spaced apart sufficiently for freedom of passage therebetween of the necks of the bottles, normally received between those members.

The members are spaced apart insufficiently in their normal positions for the passage therebetween vertically of the holding ring and locking ring of each bottle. However, I have made provision for relative displacement of the members 56 and 58 to allow these bottle rings to pass freely out of the throat formed thereby when the bottles are to be discharged from the receiving unit into the loading unit, as will be described.

The rolls 56 are formed of steel or other suitable material and are smooth throughout their length. These are adapted to be rotated at relatively high speed during operation of the machine in filling the case, and serve to facilitate the downward movement of the bottles along the throat as well as the separation of the bottles from each other. At the same time the smooth surface on each of the rolls 56 tends to separate the bottles without danger of crowding in the throat and allows them to be properly spaced apart and to be retained therein until received by the loading unit.

Each roll 56 is journaled at one end on a support 60 (Fig. 18) suspended from the auxiliary frame 50, while the opposite end of the roll 56 is journaled in a bearing 62 mounted in a cross member 64 of the frame 50.

All of the rolls 56 of the receiving unit are interconnected by driving means, such as belts 66, for uniform rotation thereof by power at relatively high speed. These rolls 56 are driven by a power driving belt 68 (Fig. 7) which extends to a flexible shaft 70, mounted on the frame 2. The shaft 70 in turn is driven by a belt 72 from the shaft 28, described above.

The bar 58 is made in two sections, one of which is tiltably mounted for transverse turning movement about its longitudinal axis on a trunnion rod 76, while the other section 58' is stationary. The stationary section 58' is supported at 78 and 80 (Fig. 19) which supports are suspended from the frame 50, and are welded or otherwise secured to the section 58'. The stationary section 58' carries a bracket 74 in which an end of the trunnion rod 76 is journaled. The opposite end of the trun-

nion rod 76 extends through a bearing 82 mounted on the cross member 64 of the frame 50.

The movable section of bar 58 is thus pivotally supported for turning movement on its longitudinal axis between the full line and dotted line positions shown in Fig. 16. This is shown as an angle bar and when in its dotted line position, the lateral edge of the bar 58 will coact with the roll 56 to form the throat therebetween for receiving the necks of the bottles. When the movable section of the bar 58 is turned on its axis, or the axis of the trunnion 76, the free edge of the movable section of the bar 58 will be moved away from the roll 56 to clear the rings on the necks of the bottles and allow the latter to drop out of the throat, being released thereby from the receiving unit.

Intermediate the length of the bar 58, adjacent the point over the loading unit, the movable section of each bar 58 is provided with a bottle retaining member or bracket 84 in position to enter between the last bottle of the row that is to be inserted in the case and the next following bottle entering the throat to hold back the latter during the discharge of the row of bottles from the throat into the loading unit. This will prevent the following bottles from passing along the throat and dropping accidentally therefrom onto the loading unit or on top of the bottles therein.

Each bar 58 also carries a plurality of combined bottle spacers and holders, generally designated at 86, each of which is pivoted at 88 on the bar 58, at the portion thereof over the loading unit. Each of these members 86 has a pointed or clearance end 90 directed toward the forward side of the receiving unit and a rearward or stop end 92 directed toward the rearward side thereof.

The bottle spacers and holders 86 are of such length and so spaced with respect to each other along the length of each bar 58 as to be turned by the necks of the bottles into parallel relation with the bar 58, when the respective bottles are moved forward to their loading positions. A bottle neck will engage the pointed end 90 of each holder 86 in its loading position, swinging the holder on the pivot 88 with its rearward end 92 projecting out in the throat in the path of the succeeding bottle to stop the latter properly spaced from the next forward bottle, thereby holding these spaced from each other, as indicated in Fig. 17.

While I have shown each bottle case C as adapted to receive twenty-four bottles, this will be provided by six rows of four bottles each, which will be spaced apart by the holders 86 in the relation shown in Fig. 18. Provision is made in the machine for receiving in each throat of the receiving unit some two or three additional bottles which will be held back, however, by the stop member 84 during the discharge of the bottles from the receiving unit. This stop member 84 normally is out of the path of the bottles moving into the throat, but as the bar 58 is turned on its axis to discharge into the loading unit, the member 84 will be turned down between the fourth bottle in each throat and the next following bottle, which thereby will hold back the following bottles during the discharge. A stop member 94 at the forward end of each throat will act to stop the first bottle moving into the throat and additional bottles will be stopped by the members 86 in properly spaced relation therefrom and from each other.

No stopping action of the holders 86 will be applied until the first bottle in the throat reaches the stop 94 (Figs. 17 and 18). In moving to its forward-most position, each bottle will deflect the respective ends of each holder 86 and move past the bottles in the throat until the next forward bottle is in place beside the forward end 90 of a holder 86, which will then prevent swinging of that holder and thereby will stop the next following bottle in the throat.

The movable section of each bar 58 is provided with

a lever 96 (Fig. 19) fixed thereto and arranged in up-standing relation, as shown in Figs. 19 to 21. The levers 96 are connected together by a bar 98, which extends to a link 100 pivoted thereto. The link 100 is pivotally connected with the upper end of an arm 102, supported by a stub shaft 104, shown in Figs. 20 and 21, which stub shaft 104 is journaled in bearings 106 supported by the sub-frame 50. The opposite end of the stub shaft 104 has fixed thereto one end of an arm 108, the opposite end of which is pivotally connected with a link 110 attached to a block 112 secured rigidly on a guide rod 114.

The guide rod 114 is slidably mounted for vertical movement in the frame 2 and in a guideway provided by a step bearing 116 on said frame. It is adapted for operation by the loading unit, as hereinafter described. Tension springs 118 and 120 connected with the arm 108 properly tension the movement of the parts and provide for restoring the parts yieldably to their initial positions after operation for discharging the bottles into the loading unit.

Inasmuch as these bottle holding and release members are thus operated automatically by the raising of the loading unit to its receiving position, there is no danger of discharge of the bottles from the receiving unit until the loading unit is ready to receive the bottles therefrom. Furthermore, the movement of the loading unit is caused by gravity and therefore gravity functions as the operating means for the release of the bottles from the receiving unit, whereby power is not required for this purpose.

The receiving unit is provided also with feeler means to ensure that a full complement of bottles will be contained therein before actuation of the receiving means to discharge the bottles therefrom. This feeler means is illustrated in Figs. 7 to 15.

Extending transversely over the throats of the receiving unit are shafts 122 spaced apart a distance substantially corresponding with the spacing of the bottles B in the throats. These shafts 122 are journaled at opposite ends in bearings formed in frame members 124 of the sub-frame 50. Each of the shafts 122 has provided rigid therewith, a saddle 126 overlying each throat of the receiving unit. The saddles 126 may be formed of wire or other suitable material and welded or otherwise rigidly fixed to the shafts.

Feelers 128 are journaled loosely on the shafts 122, and preferably, as shown, in the form of elongated bars. Each of the feelers 128 is pivoted at one end on the shaft 122 and extends laterally therefrom within a saddle 126, the free end of the feeler bar 128 normally being in position to be seated upon the cap of a bottle in its properly spaced relation in the throat of the receiving unit.

These parts are so positioned relative to each other, as shown in Fig. 11, that the feelers 128 normally rest in the saddles 126, in which event they exert a weight on each shaft 122 tending to rotate the latter in a clockwise direction, as viewed in Fig. 11. However, when a bottle is moved under the free end of the feeler 128, as shown at the left in Fig. 11, the bottle lifts the feeler out of the saddle 126 and thereby releases the latter from the weight of the feeler.

Each of the shafts 122 projects at one end through one of the frame members 124 and the projecting end thereof is provided with an arm 130 fixed thereon, as shown in Figs. 10 and 12. Each arm 130 has an offset end portion, as viewed in Fig. 10, normally underlying a bail 132 that extends over the series of arms 130 of the receiving unit and bears thereon, as viewed in Fig. 12.

The opposite ends of the bail 132 are secured to a shaft 134 suitably journaled in the frame 50 and free for turning movement relative thereto. The free end of the shaft 134 carries a weight 136 offset therefrom, as shown in Figs. 10 and 15, in such position as normally to turn the shaft 134 when permitted by the bail 132, acting

on the arms 130. However, the parts are so balanced in their adjustment that as long as any of the feelers 128 are in the lowered positions in the saddles 126, the weight of the feelers acting on each of the shafts 122, will hold the corresponding arm or arms 130 raised and thereby prevent swinging of the bail 132 and turning movement of the shaft 134.

Just as soon as all of the feelers 128 have been lifted out of the saddles 126, and all of the weight of the feelers taken off the shafts 122 and the arms 130, the counterweight 136 will rotate the shaft 134 as then permitted by the arms 130. This action will cause a swinging motion of a mercury switch 138 carried by the shaft 134, thereby closing the circuit to the solenoid 140 that controls the action of the loading unit, as illustrated in Fig. 31. Upon release of the loading unit by the actuation of the solenoid 140, the loading unit will be moved up to the receiving unit and thereby receive therein the bottles, as hereinafter described.

It has been pointed out above that the receiving unit will accommodate in the throats thereof additional bottles, more than the full complement of bottles to be introduced into the case. Additional feeler members may be provided if desired to act on the forwardmost of these additional bottles, as indicated at 142 in Fig. 11. The feeler members 142 will act to stabilize the bottles, as the latter are moved under the feeler members. These feeler members 142 are pivotally supported in saddles 144, supported by a transverse shaft 146 on which the feeler members 142 are pivoted.

Loading unit

The loading unit is illustrated in detail in Figs. 22 to 30. This loading unit comprises upper and lower sections 148 and 150, respectively, spaced apart vertically with an interposed grid plate 152 therebetween. Each of these sections including the grid plate is provided with a plurality of cells therein formed by intersecting partitions, welded or otherwise secured together, with the cells of the sections 148 and 150 in alignment with each other and adapted to be aligned with the cells of the grid plate 152. The number of cells in each of these parts corresponds with the number of bottles accommodated in the receiving unit and adapted to fit in each of the cases C. In the illustrated embodiment, there are six rows of cells, with four cells in each row, this being the relation of the bottles received by the throats of the receiving unit.

The section 148 is provided with V-shaped notches 154 in each side of each cell at the upper end thereof, leaving upturned pointed corners on each cell as indicated at 156 in Figs. 26 and 27. This has a tendency to direct the bottles into the cells without danger of tipping over in the opposite direction if misalignment should result. At the same time, there is less tendency of breakage of the bottles as a result of contacting of a bottle with a pointed edge rather than a uniform contact with a side of a cell, as I have discovered from actual experience therewith.

The cells of the lower section 150 are provided with downwardly projecting fingers 158 thereon, each of which converges inwardly acting as guides for the bottles as they drop from the loading unit into the case C. The fingers 158 are formed of flat springs and may have longitudinally extending corrugated or ribbed portions 160 lengthwise thereof to stiffen the fingers and increase the resiliency thereof in acting on the bottles.

The loading unit is slidably mounted vertically between upright guide posts 162 and 164, rigidly fixed to the frame 2 at the top and bottom thereof as illustrated in Fig. 24.

A guide bracket structure, generally indicated at 166, has portions thereof secured rigidly to the sections 148 and 150 of the loading unit, as will be apparent from Fig. 28, on opposite sides of the grid plate 152. The guide unit 166 carries a plurality of guide rollers 168, arranged in triangular relation, as shown in Fig. 29, to guide the

vertical sliding movement of the loading unit along the column 162.

The column 164 is shown in Fig. 25 as an angle bar. Accordingly guide rollers 170 are arranged to bear against opposite sides of one flange of the column 164 and thereby guide the loading unit in its vertical movement relative to this column. The rollers 170 are journaled in a guide bracket 172 fixed at vertically spaced points to the respective sections 148 and 150 of the loading unit.

The loading unit is adapted to be moved upwardly by gravity, for which purpose I have provided flexible devices, such as chains 174 and 176, attached respectively to the guide brackets 166 and 172 at one end of each, and extending upwardly therefrom over guide members 178 and 180 carried by the frame 2 in elevated positions. The opposite ends of these flexible devices extend downward to counter-weights 182 and 184, respectively, each of which is mounted in guides 186 mounted on the frame 2. The counter-weights 182 and 184 serve to raise the loading unit to the receiving unit to receive the bottles therefrom as soon as a full complement of bottles is contained within the receiving unit and a case C is in place beneath the receiving unit to receive the bottles therefrom. This action is controlled also by the solenoid 140 energized by an electric circuit controlled by the switch 138, as described above.

The grid plate 152 is normally in the position shown in full lines in Fig. 26 when the bottles enter the loading unit, in such relation that the transverse members of the cells of the grid plate are disposed intermediate the width of the cells of the receiving section 148, whereby to support the bottles in the latter until the loading unit has moved downward to its lowermost position for discharge of the bottles into the case C. Slides 188 on each opposite side of the grid plate 152 extend through guides 190 on the section 148 to guide the back and forth movement of the grid plate relative thereto. Tension springs 192 connected with the slides 188 normally tend to project the grid plate to the right, as viewed in Fig. 30, to the position shown.

The grid plate may be moved back for registry of the cells thereof with the cells in sections 148 and 150 by links 194 pivotally connected at one end of each to the grid plate 152 and at the opposite end to one arm of a bell-crank lever 196. The other arm of the bell-crank lever 196 carries a bracket 198 adjustably mounted thereon by a pin and slot connection, generally designated at 200. A roller 202 is journaled on the bracket 198 in position to engage an abutment 204 secured to the frame or to the column 162 at one side of the loading unit, as shown in Fig. 30.

The controls for the loading unit are shown in detail in Figs. 31 and 32.

A support structure generally designated 206 is secured to the column 162 in an elevated position beside the loading unit. The abutment 204 may be a part of this support structure or separately connected with the column. It is shown on the opposite side of the column from the support structure. The structure 206 has arms 208 and 210 extending upwardly and downwardly respectively relative thereto and pivotally connected with the structure at 212 for lateral swinging movement out of the vertical plane of these members, as shown in Figs. 31 and 32.

Mounted on the arm 208 is an upwardly facing catch 214 pivoted to the arm at 216 and normally bearing against a stop 218 on the arm 208. A downwardly directed catch 220 is pivotally supported at 222 on the arm 210 normally bearing against a stop 224 on said arm 210. These catches 214 and 220 are in the form of bell-cranks, one arm of each of which is positioned to engage and limit the movement of the guide bracket 166 as shown in Fig. 32, while the opposite end of the bell-crank arm 214 projects laterally and is actuated by an interposed spring or springs 226 sleeved over a guide rod 228, slid-

ably mounted through openings in the lateral arms of the bell-crank members 214 and 220. The spring or springs 226 normally tend to hold these respective members yieldably in their engaged positions against the stops 218 and 224 for retaining the bracket 166 in either extreme position shown in dotted lines in Fig. 32.

The arm 210 is adapted to be moved by the solenoid 140. Accordingly, a pin 230 fixed to the arm 210 is engaged by a yoke 232, mounted on a stub shaft 234 journaled in a side of the support structure 206 and also supporting an arm 236 connected by a link 238 with the armature or core of the solenoid 140. Thus, upon energizing of the solenoid 140, when the receiving unit feeler mechanism has indicated a full complement of bottles, the solenoid will actuate the arm 236 and yoke 232 to move the arm 210 laterally, releasing the catch 220 from the bracket 166, and thereby allowing the loading unit to move upward by gravity, acting on the counter-weights 182, 184. The bracket 166 will be engaged, as it is thus moved to its upper dotted line position in Fig. 32, by the spring catch 214 and will be retained in such position until the latter is released. A limit switch 240 in the circuit 241 of the solenoid controls said circuit, with the switch 138 in series therewith. The switch 240 will be closed upon engagement by the bracket 166 only when the loading unit is in its lower position.

The arm 208 is provided with a pin 242, which is engaged by a yoke 244 on a shaft 246 carried by the supporting structure 206. The shaft 246 carries an arm 248 connected by a link 250 which extends downward to a cradle 253 below the case receiving and guiding structure shown in Figs. 33 to 36.

This cradle 253 is supported by one or more brackets 255 at one end thereof, which bracket 255 is pivoted intermediate its ends on a shaft 258 that extends from side to side of the frame 2 and is supported thereby. The lower ends of the brackets 255 have a plurality of springs 260 connected therewith, the free ends of which springs are anchored to the frame 2.

At the forward end of the cradle 253 is an upright stop member 257 slidably mounted in a guide 259 on the frame 2. The stop member 257 carries a catch 261 in position to engage an abutment 262 on the frame. The stop member 257 is supported on a pivoted link 256 mounted at its opposite end on the frame and connected with the cradle 253 intermediate its ends. A spring 263 normally urges the stop member 257 in one direction.

Extending outwardly from the opening 8 in a side of the casing is guideway 264, also provided with rollers for freedom of movement of the cases C therealong by gravity into and through the case filling machine. The guideway 264 is spring tensioned to allow for oversized or swelled cases.

A feed roll is shown at 266 intermediate the guideway 264 and the cradle 253, which feed roll is continuously power driven by a shaft 268 and gearing 270 from the motor 30, as shown in Fig. 5.

A roller support member is shown at 274 intermediate the guideway 264 and the feed roll 266 connected with an arm 252 which is mounted on the frame and pivotally connected with the cradle 253. The member 274 is adapted to be raised into the path of a case moving to the feed roll 266 to lift the case off the feed roll whenever an empty case is in position on the cradle 253.

When a case C on the cradle 253 is filled, the weight thereof will cause the forward end of the cradle to lower against the tension of the springs 260, rocking on the cross-shaft 258. A bracket 275 on the cradle 253 is connected with the link 250 moving the latter down to release the catch 216 (Fig. 31). This same action also moves the stop member 257 down to a position even with or below the bottom of the case. The stop member 257 travels down about three times as fast as the forward end of the cradle 253, due to the linkage connection therewith. The stop member 257 is latched in this

lowered position by the catch 261 engaging the abutment 262 (Fig. 36).

As soon as a full case rolls out of the machine, the case stop member 257 moves up approximately one inch, permitting the catch 261 to engage the catch stop 262. When an empty case strikes the member 257 in this position, the catch 261 is released from the stop 262. This releases the member 257 allowing this member to move up further to the full position shown in Fig. 33.

Operation

The bottles are received from the filling conveyor line or lines onto the power conveyor 12 of the case filling machine as shown at the right in Fig. 1. If the case filling machine is used in connection with a single bottle filling unit, the bottles are divided by the member 46 into separate portions laterally placed on the conveyor 12. On the other hand, if more than one line of bottles are received on the conveyor from separate filling machines, the division member 46 will not be required, but may be used where desired.

The bottles are then moved forward by the conveyor 12 to and over the plate 47 which lies flat over the conveyor 12, being spread out into a plurality of rows disposed lengthwise of the conveyor substantially throughout the lateral width thereof. These rows are shown, being the number customarily provided for cases of twenty-four bottles, although the number of rows may be varied according to the application of this invention. The bottles are separated in the respective rows by the spacers 49 which overlap the forward end of the conveyor as will be apparent from Figs. 1, 3 and 4. The bottles are carried forward by the conveyor 12 sufficiently to cause their forward ends to be engaged by the receiving unit, directly into the respective bottle holders of the latter, formed by the members 56 and 58, shown in Figs. 16 to 19. Each row of bottles is directed into the throat of one of the bottle holders formed between the roll 56, which is operating at high speed, and the bar 58 which normally is turned to its full line position in Fig. 16.

Each bottle holder is outwardly inclined so that the bottles will have a tendency to be moved freely along the throat within the bottle holder where provision is made for proper separation of the bottles from each other, and holding them spaced apart. The first moved forward in each throat engages the stop member 94. It serves also to engage the forward edge of the spacer member 86, swinging the latter to its full line position in Fig. 17 and moving the heel of said member into stop engagement with the next succeeding bottle, keeping the latter properly spaced from the first bottle. The second bottle acts in like manner on the second stop member 86 and swinging it into holding relation with the third bottle. This action continues throughout the length of each bottle holder.

It is preferred that there be four bottles in each throat, although five bottles may be accommodated therein as indicated in Fig. 18, but only four will be discharged. The stop member 84 will enter the throat between the fourth and fifth bottles, holding back the latter during the discharge of four bottles therefrom.

Each of the bottles will be acted on by engagement of one of the feelers 128 therewith, lifting the latter out of its saddle 126 and out of pressure engagement with its respective cross shaft 122. The arms 130 on all of the cross shafts 122 are engaged by the bail 132 connected with the shaft 134 carrying a counter-weight 136 as shown in Figs. 10 to 15. The relation of these parts is such that the shaft 134 does not rotate until all of the feelers 128 have been lifted from the saddles 126 away from pressure engagement with the cross shafts 122, by a full complement of bottles in the receiving unit. As soon as this happens, the weight 136 will turn the shaft 134 and the switch 138 mounted thereon to close the electric circuit 241 to the solenoid 140. The circuit 241 also includes a

limit switch 240 which is closed when the case holder is in its lower position.

The energizing of the solenoid 140 actuates the leverage 232—238 (Figs. 31 and 32) to disengage the catch 220 from the bracket 166. The loading unit, being empty at the time, will be moved upward in the machine by the action of the counter-weights 182 and 184 that are heavier than the empty loading unit, but lighter than the loading unit when filled. The loading unit thus telescopes over the suspended bottles hanging down from the receiving unit as illustrated in Fig. 8, with a bottle slipped into each cell of the top section 148 of the loading unit, where the bottles are supported by the grid plate 152 which normally is in the position shown in Fig. 26. This upward movement of the loading unit to its top position causes the bracket 166 to strike the pin 114 (Figs. 20 and 21), thus moving the latter upward and actuating the linkage 100—112 to shift the position of the movable sections of the bars 58 from the dotted line to the full line position shown in Fig. 16. The throat of each bottle holder normally is sufficient to receive the necks of the bottles therein and to hold the bottles by the guide rings on the throats. However, upon swinging movement of the movable sections of the bars 58, sufficient clearance is provided to allow the bottles to slip out of the throats and thus to discharge into the loading unit.

The bottles are thus retained in the loading unit in elevated position until an empty case is fed into the machine by the case feeding roller 266 onto the cradle 253. When an empty case strikes the stop member 257, the latter is released from the catch stop 262, permitting the case holder cradle 253 to swing upward, which is accomplished by the springs 260 connected therewith. This upward movement of approximately one inch causes an upward sliding movement of the plunger rod 250 which acts to move the arm 208 on its pivot 212 and thereby disengage the catch 214 from the bracket 166 so as to release the loading unit filled with bottles for downward travel to its lowered position into the case, for unloading the charge of bottles therein.

When the loading unit reaches its lowered position, the roller 202 (Figs. 26, 30) carried thereby, engages the abutment 204, shifting the grid plate 152 from the position shown in Fig. 26 to a position aligning the cells in the grid plate with the cells in the loading unit. This releases the bottles in the loading unit for discharge by gravity into the case C which is in position beneath the loading unit in its lowered position.

The full case is held in this position until sufficient bottles for a charge are introduced into the receiving unit. As soon as the receiving unit is filled with a complement of bottles, the solenoid 140 is energized by the closing of the circuit 241, releasing the loading unit for upward movement as described above.

As soon as the flexible guide fingers 158 on the loading unit clear the tops of the bottles in the loaded case, the cradle 253 drops down (Fig. 36), causing the stop member 257 to be withdrawn out of the path of the now downwardly inclined cradle 253, thereby allowing the filled case to roll out of the machine by gravity onto a discharge conveyor. At the same time, this movement of the cradle causes the member 274 to be withdrawn from underneath the empty case allowing the latter to be lowered onto the feed roll 266 which causes it to move into proper position in the machine to receive the next load of bottles. The slight elevation of the next following case until needed saves the feed roll 266 from unnecessary wear when no pressure is required.

While the machine is power operated, very little power is required inasmuch as the principal operations are performed by gravity, utilizing the weight of the bottles and the counterweights, to cause the vertical reciprocating movement and transfer of the loading unit and bottles from the receiving unit into the case as well as to cause the movement of the empty and full cases into and out

of the machine. No clutch or variable speed devices are necessary as the presence of the bottles and cases alone control the speed of the machine. The loading unit will not move up or down until bottles and case are present, thereby insuring a proper filling of the case with the bottles and preventing improper operation.

The entire machine is comparatively simple in structure and operation. The loading unit is mounted on roller bearings for quick and easy operation without undue noise or complexity of operation. It requires a minimum of floor space and little attention, considering the function performed thereby.

While the invention has been illustrated and described in one embodiment, it is recognized that variation and changes may be made therein without departing from the invention as set forth in the claims.

I claim:

1. In a bottle case filling machine, a combination of a receiving unit having means for receiving and supporting by the necks thereof a complement of bottles in pre-determined relation, and a loading unit below the receiving unit arranged to receive the complement of bottles from the receiving unit and having means for bodily conveying said complement of bottles downwardly from the receiving unit to transfer said bottles to a case.

2. In a bottle case filling machine, a combination of a receiving unit having means for receiving and supporting by the necks thereof a complement of bottles in pre-determined relation, and a loading unit below the receiving unit having means for receiving a complement of bottles from the receiving unit and having means for bodily conveying said complement of bottles downwardly from the receiving unit to transfer said complement of bottles jointly to a single case.

3. In a bottle case filling machine, a combination of a receiving unit having means for receiving and supporting by the necks thereof a pre-determined number of bottles in definite spaced relation to each other, and a loading unit below the receiving unit having means for receiving the plurality of bottles from the receiving unit and having means for bodily conveying said complement of bottles downwardly from the receiving unit for transferring said plurality of bottles simultaneously to a case.

4. In a bottle case filling machine, a combination of a receiving unit having means for receiving and supporting by the necks thereof a predetermined number of bottles in spaced relation to each other, a gathering unit having means for conveying bottles to said receiving unit, and a loading unit below the receiving unit having means for receiving a pre-determined number of bottles from the receiving unit and having means for bodily conveying said complement of bottles downwardly from the receiving unit transferring said bottles to a case.

5. In a bottle case filling machine, the combination of a receiving unit having means for receiving a pre-determined number of bottles, means for suspending said pre-determined number of bottles from the necks thereof in spaced relation from each other, and a loading unit having means for bodily conveying said complement of bottles and having means for engaging the spaced bottles in the receiving unit and transferring the bottles therefrom to a case.

6. In a bottle case filling machine, the combination of a receiving unit having means for receiving a pre-determined number of bottles, means for suspending said pre-determined number of bottles from the necks thereof in spaced relation from each other, and a loading unit having means for engaging the spaced bottles in the receiving unit and transferring the bottles therefrom to a case, and a discharge unit including conveying means for the case for moving said case into and out of receiving relation with the loading unit.

7. In a bottle case filling machine, the combination of a receiving unit having means for receiving a plurality of bottles, a gathering unit including a conveyor for sup-

porting the bottles and moving the bottles into the receiving unit, said receiving unit including means for suspending the bottles by the necks thereof in pre-determined spaced relation, a loading unit including a body having cells arranged for telescoping relation with the suspended bottles in the receiving unit and for transferring the bottles therefrom to a case, and a conveyor for the case for moving the latter into and out of supported position relative to the loading unit.

8. In a bottle case filling machine, a receiving unit including a plurality of bottle holders, each of said holders comprising a pair of spaced parallel members mounted in downwardly inclined relation, forming a throat therebetween, adapted to receive a plurality of bottles therein, said members being arranged in embracing relation with the bottles for supporting the bottles in the throat, one of said members having a relatively smooth peripheral surface, means for rotating the last mentioned member to facilitate movement of the bottles along the throat, and means mounting the other member for turning movement to discharge the bottles from the throat.

9. In a bottle case filling machine, a receiving unit including a plurality of bottle holders, each of said holders comprising a pair of spaced parallel members mounted in downwardly inclined relation, forming a throat therebetween, adapted to receive a plurality of bottles therein, said members being arranged in embracing relation with the bottles for supporting the bottles in the throat, one of said members having a relatively smooth peripheral surface, means for rotating the last mentioned member to facilitate movement of the bottles along the throat, and means mounting the other member for turning movement to discharge the bottles from the throat, one of said members having a plurality of spacing devices mounted thereon arranged for swinging movement transversely of the throat for holding the bottles spaced apart therein.

10. In a bottle case filling machine, a receiving unit including a plurality of bottle holders for receiving and suspending a complement of bottles in predetermined relation to each other, and feeler means spaced at intervals corresponding with the respective individual bottle positions and arranged in position for contact with the bottles in the receiving unit.

11. In a bottle case filling machine, the combination of a receiving unit having means for receiving and holding a complement of bottles in predetermined relation to each other, a loading unit, movably mounted in the machine for movement into receiving relation with the complement of bottles and to transfer the bottles to a case, and feeler means spaced at intervals corresponding with the respective individual bottle positions and connected with the receiving unit arranged for engagement by the tops of the respective bottles therein for controlling the actuation of the loading unit.

12. In a bottle case filling machine, the combination of a receiving unit having means for receiving and holding a complement of bottles in predetermined relation to each other, a loading unit mounted in the machine for movement into receiving relation with the complement of bottles and to transfer the bottles therefrom to a case, and means for controlling the movement of the loading unit including feelers mounted in position in the receiving unit for contact with the tops of the respective bottles therein to actuate said means only when a full complement of bottles is present in the receiving unit.

13. In a bottle case filling machine, a receiving unit having a plurality of bottle holders, each adapted to support a plurality of bottles, cross shafts extending transversely of the bottle holders, saddles fixed to the cross shafts, feeler members journaled on the cross shafts in position to raise in the saddles and to be lifted therefrom by the bottles, and control means operated jointly by the shafts for controlling discharge of the bottles from the receiving unit thereby.

14. In a bottle case filling machine, a loading unit comprising a body having a plurality of cells therein, each of which has upwardly extending pointed members thereon to facilitate direction of the bottles into the cells, a grid member extending transversely beneath the cells for supporting the bottles therein, and means for moving the grid member for discharging the bottles from the cells.

15. In a bottle case filling machine, a loading unit comprising a body having upper and lower sections, a grid member extending transversely between the sections and slidably mounted relative thereto, each of said sections of the grid member having cells therein adapted to receive bottles, said upper section having notched edges on the cells to facilitate direction of the bottles into the cells, the lower section having inwardly directed yieldable spring members thereon for direction into the case to cushion discharge of the bottles from the loading unit into the case.

16. In a bottle case filling machine, a loading unit comprising a body having upper and lower sections, a grid member extending transversely between the sections and slidably mounted relative thereto, each of said sections of the grid member having cells therein adapted to receive bottles, said upper section having notched edges on the cells to facilitate direction of the bottles into the cells, the lower section having inwardly directed yieldable spring members thereon for direction into the case to cushion discharge of the bottles from the loading unit into the case, guides connected with the loading unit for upward and downward movement relative thereto, and counterweights connected with the loading unit for causing upward movement thereof and permitting downward movement of the loading unit filled with bottles.

17. In a bottle case filling machine, the combination of a receiving unit having means for receiving and holding a complement of bottles in predetermined spaced relation, means spaced downwardly below said receiving unit for supporting a bottle receiving case thereon, a loading unit having means for receiving therein the complement of bottles and for moving the bottles downwardly thereby to the bottle case, said loading unit having a slidable grid movably mounted therein for receiving the bottles directly thereon from the receiving unit, said grid having openings therein for downward passage of the bottles from the supported positions thereon, and means for moving said grid to release the bottles from the loading unit upon movement of the loading unit into proximity with the case.

18. In a bottle case filling machine, the combination of a receiving unit having means for receiving a plurality of bottles in multiple rows therein and additional means for separating the bottles from each other in the respective rows, means mounted in downwardly spaced relation below the receiving unit for supporting a bottle case thereon, and a loading unit having means for receiving a plurality of bottles from the receiving unit, a slidable grid for supporting the bottles directly thereon after removal from the receiving unit, said grid having openings therethrough for downward passage of the bottles from the supported positions thereon, means mounting said loading unit for downward movement from the receiving unit substantially to the case, and means for releasing said slidable grid after movement of the loading unit downward to the case to discharge the bottles therefrom into the case by gravity.

19. In a bottle case filling machine, a receiving unit comprising a pair of bottle support members spaced apart transversely and adapted to receive a plurality of bottles therebetween, one of said members comprising a roller, the other member being fixed and mounted for movement toward and from the roller and coacting therewith to confine the bottles therebetween by engagement with the necks thereof, and means for moving the last-mentioned

member away from the roller to disengage the bottles from the receiving unit.

20. In a bottle case filling machine, a receiving unit comprising a pair of elongated bottle supports spaced apart transversely and adapted to receive a plurality of bottles therebetween, one of said supports comprising a roller, means for rotating said roller, the other support comprising a stationary member, and means mounting the stationary member for movement away from the roller to release the plurality of bottles therefrom.

21. In a bottle case filling machine, a receiving unit comprising a pair of upwardly inclined bottle support members having means for admitting bottles thereto at the upper ends of said members, one of said members comprising a roller journaled for turning movement, power means connected with the roller for rotating the latter to move the bottles lengthwise of the support members, the other support member being stationary and mounted for movement toward and away from the roller for discharge of the bottles therefrom.

22. In a bottle case filling machine, a receiving unit comprising a pair of upwardly inclined bottle support members having means for admitting bottles thereto at the upper ends of said members, one of said members comprising a roller journaled for turning movement, power means connected with the roller for rotating the latter to move the bottles lengthwise of the support members, the other support member being stationary and comprising a bar with an edge in position to engage the necks of the bottles to hold the latter in cooperative clamping relation against the roller, and means mounting the bar for bodily movement toward and from the roller for disengaging the bottles from the receiving unit.

23. In a bottle case filling machine, a receiving unit comprising a pair of upwardly inclined bottle support members having means for admitting bottles thereto at the upper ends of said members, one of said members comprising a roller journaled for turning movement, power means connected with the roller for rotating the latter to move the bottles lengthwise of the support members, the other support member being stationary and comprising a bar with an edge in position to engage the necks of the bottles to hold the latter in cooperative clamping relation against the roller, means mounting the bar for bodily movement toward and from the roller for disengaging the bottles from the receiving unit, and a plurality of bottle holders movably mounted on the bar and spaced lengthwise thereof for holding the bottles spaced apart between the support members.

24. In a bottle case filling machine, a receiving unit comprising a pair of bottle support members spaced apart and adapted to receive a plurality of bottles therebetween for supporting the bottles by the necks thereof, and a plurality of bottle holders spaced lengthwise of one of the members and mounted thereon for inward movement relative thereto into the path of the bottles between the members for holding the bottles spaced apart therebetween.

25. In a bottle case filling machine, a receiving unit comprising a pair of elongated bottle support members spaced apart transversely to form a throat therebetween adapted to receive the bottles therein and to support the bottles by the necks thereof, and a plurality of bottle holding members pivotally mounted on one of the bottle support members and spaced apart lengthwise thereof for swinging movement into the throat to hold the bottles spaced apart therein.

26. In a bottle case filling machine, a receiving unit comprising a pair of elongated bottle support members spaced apart transversely with a throat therebetween adapted to receive a plurality of bottles therein and to support the bottles by the necks thereof, a plurality of bottle holder members spaced lengthwise of one of the bottle support members, means pivotally mounting the holder members on said support member, each of the

holder members having an end portion in position to be engaged by a side of a bottle neck and an opposite end portion in position to project into the throat to stop the movement of the bottles therethrough when the first-mentioned end portion is engaged by the side of a bottle neck.

27. In a bottle case filling machine, a receiving unit comprising means for receiving and holding a complement of bottles in predetermined spaced relation to each other, and feeler means for the complement of bottles comprising a plurality of feeler members spaced at intervals corresponding with the positions of the bottles in the receiving means, means pivotally supporting the feeler members for upward swinging movement by the respective bottles, and means for releasing the bottles from the receiving unit upon engagement of the feeler members by the complement of bottles.

28. In a bottle case filling machine, a receiving unit comprising means for receiving and suspending a complement of bottles in predetermined spaced relation, means for releasing the complement of bottles from the receiving means, and feeler means for controlling the action of the releasing means and comprising a plurality of feeler members spaced at intervals corresponding with the positions of the complement of bottles in the receiving means, means pivotally mounting the feeler members for upward swinging movement in response to engagement thereof by the respective bottles, and means actuated in response to the engagement of all of the feeler members by the complement of bottles for operating the bottle release means.

29. In a bottle case filling machine, a loading unit, means mounting the loading unit for vertical movement, means for moving the loading unit up and down, said loading unit comprising a body having a plurality of cells therein adapted to receive bottles in the cells, a grid member extending transversely of the body beneath the cells, means mounting the grid member on the body for transverse movement relative thereto, said grid member having openings therein in position for alignment with the cells to discharge the bottles therefrom, means mounting the loading unit for upward and downward movement in the machine, and means operative upon downward movement of the loading unit for moving of the grid member relative to the body into said discharge position.

30. In a bottle case filling machine, a receiving unit comprising means for suspending bottles by the necks thereof including a pair of elongated spaced members arranged for movement of the bottles therealong and adapted to receive the necks of a plurality of bottles therebetween, said members being arranged in embracing relation with the bottle necks for supporting the bottles thereby, and means connected with at least one of the pair of spaced members for spacing the bottles from each other during the movement of the bottles therealong and for holding the bottles in properly spaced relation.

31. In a bottle case filling machine, a receiving unit

comprising means for suspending bottles by the necks thereof including a pair of elongated laterally spaced members with a throat therebetween arranged for movement of the necks of the bottles through the throat, said members being arranged for embracing relation with the bottle necks and supporting the bottles thereby, and means spaced lengthwise of the throat and connected with at least one of said members for spacing the bottles from each other during movement of the bottles through the throat and for maintaining the bottles in spaced relation to each other.

32. In a bottle case filling machine, a receiving unit comprising means for suspending bottles by the necks thereof including a pair of elongated laterally spaced members with a throat therebetween arranged for movement of the necks of the bottles through the throat, said members being arranged for embracing relation with the bottle necks and supporting the bottles thereby, means spaced lengthwise of the throat and connected with at least one of said members for spacing the bottles from each other during movement of the bottles through the throat and for maintaining the bottles in spaced relation to each other, and means for causing relative movement between the members for discharge of the bottles from the throat.

33. In a bottle case filling machine, a receiving unit comprising means for suspending bottles by the necks thereof including a pair of elongated laterally spaced members with a throat therebetween arranged for movement of the necks of the bottles through the throat, said members being arranged for embracing relation with the bottle necks and supporting the bottles thereby, means spaced lengthwise of the throat and connected with at least one of said members for spacing the bottles from each other during movement of the bottles through the throat and for maintaining the bottles in spaced relation to each other, and means for moving one of the members relative to the other for discharge of the bottle necks from the throat.

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