

April 17, 1951

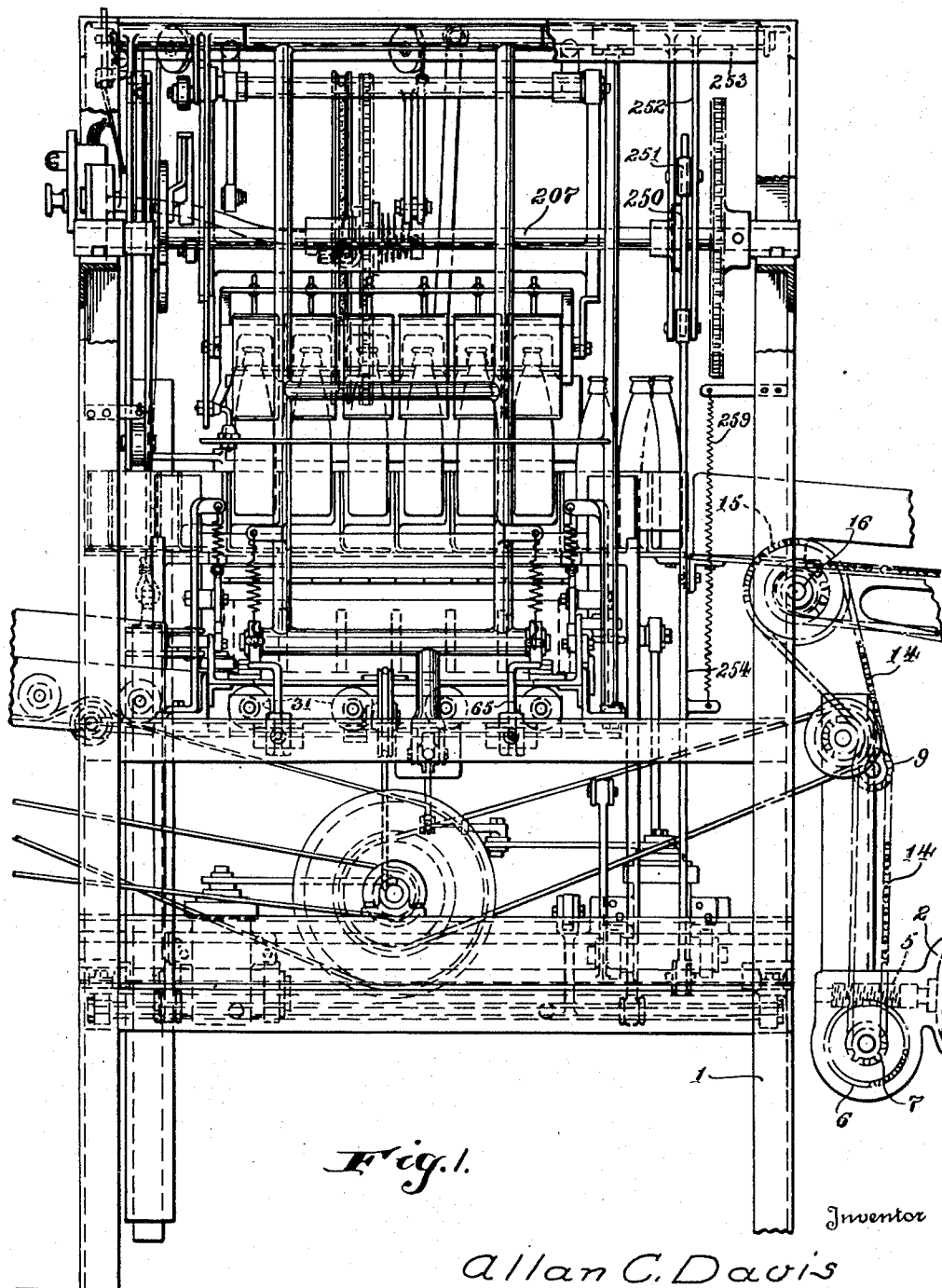
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2,549,062

BOTTLE CRATE SHAKER AND CLEANER

Original Filed Dec. 30, 1942

7 Sheets-Sheet 1



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April 17, 1951

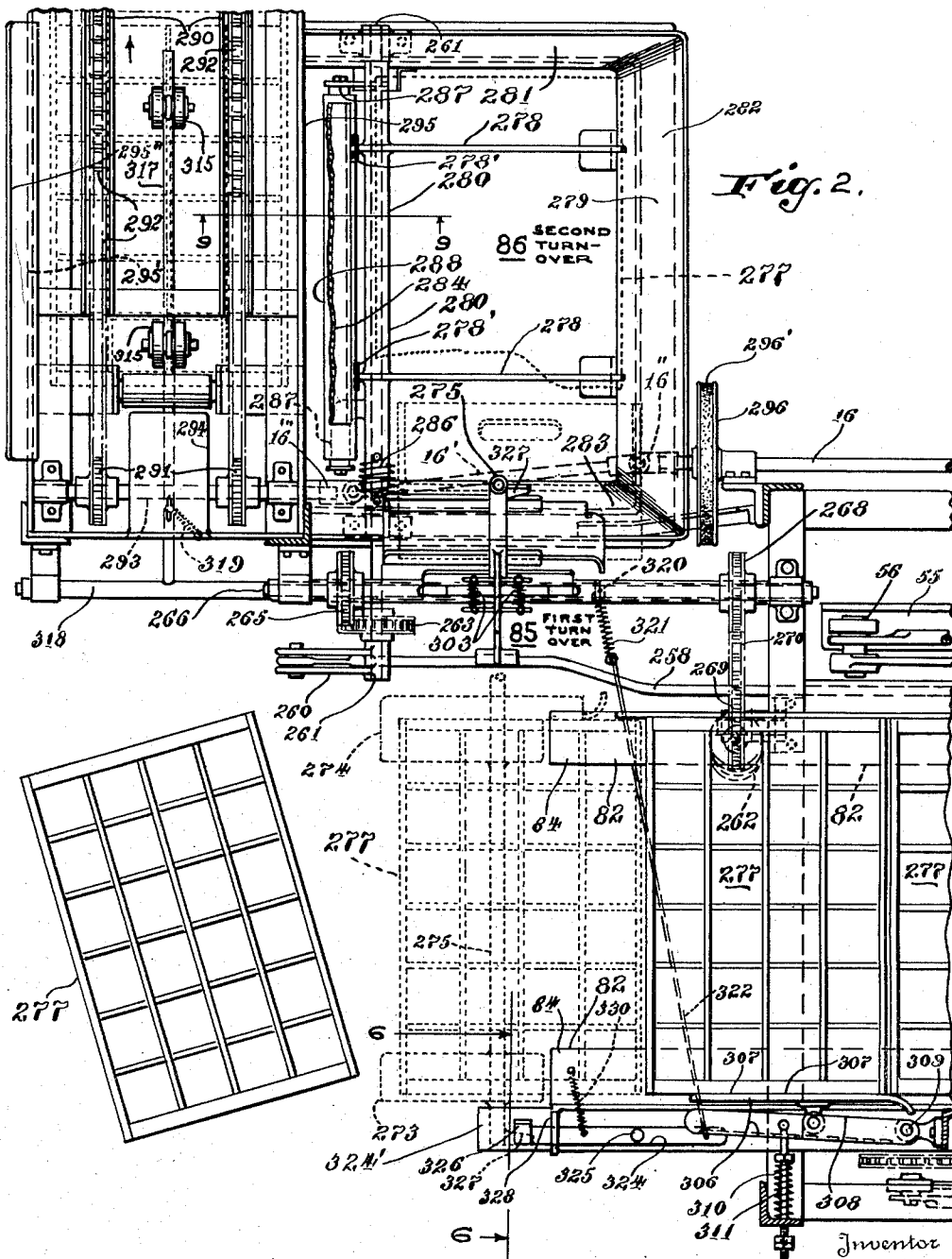
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BOTTLE CRATE SHAKER AND CLEANER

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BOTTLE CRATE SHAKER AND CLEANER

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7 Sheets-Sheet 3

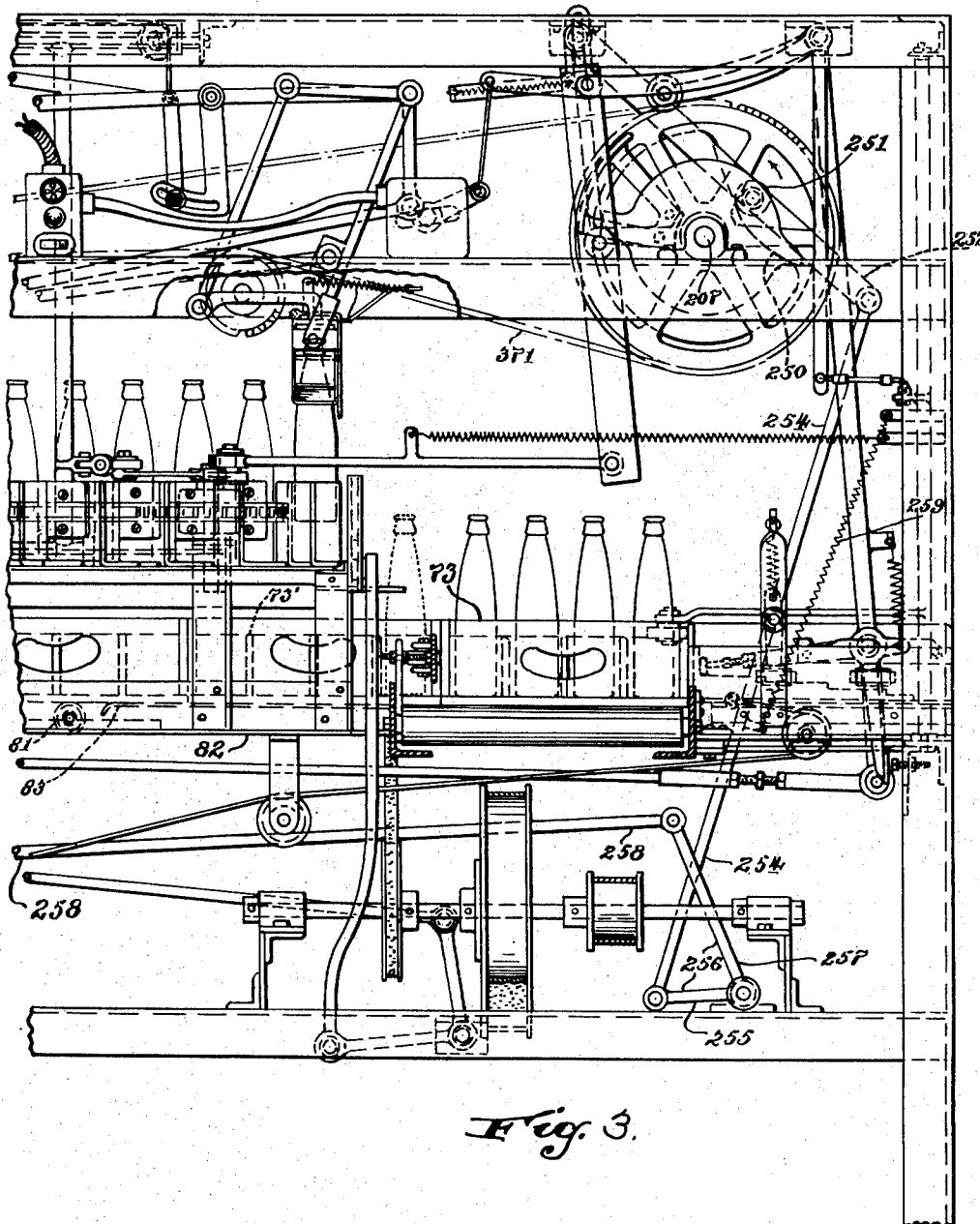


Fig. 3.

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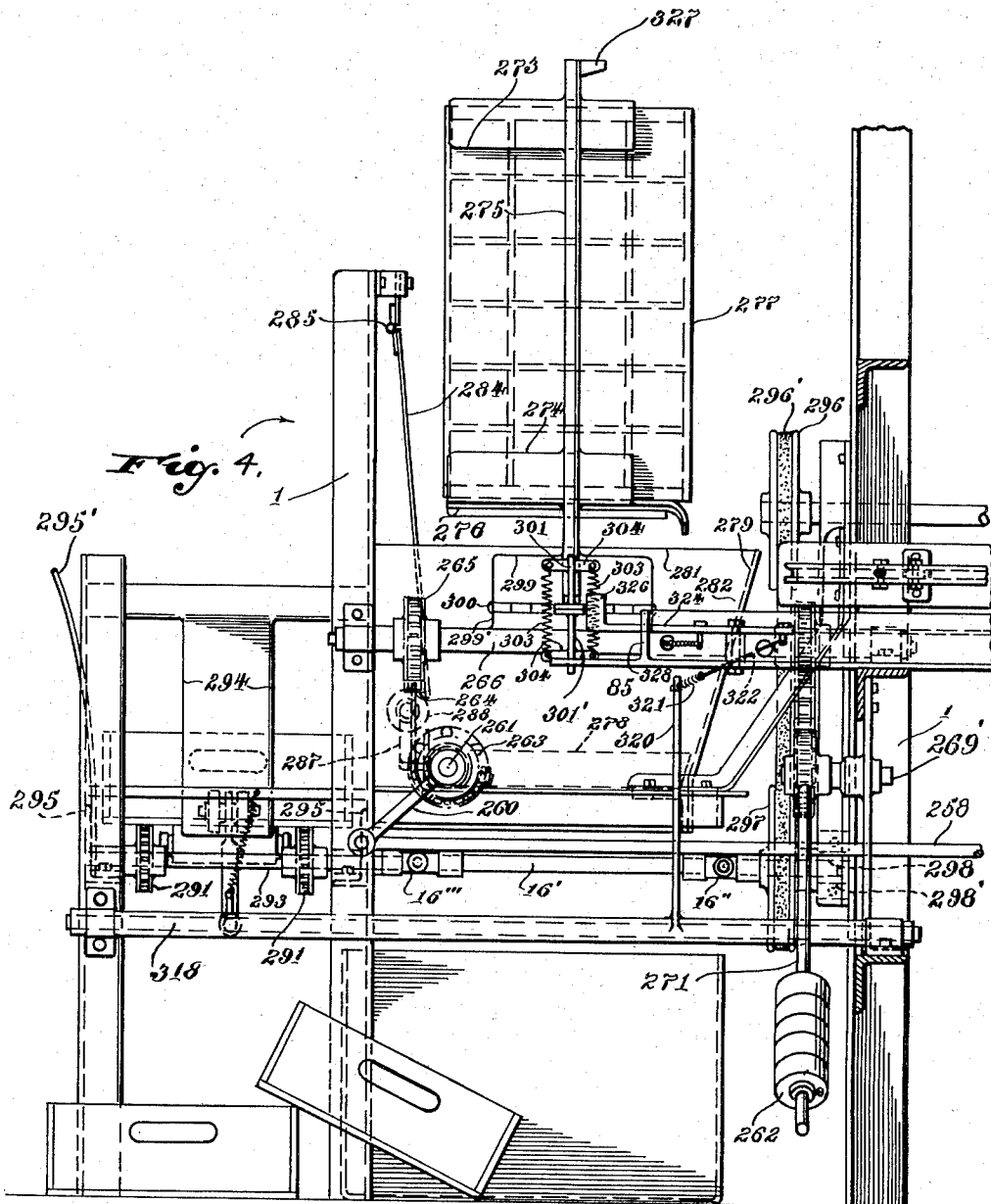
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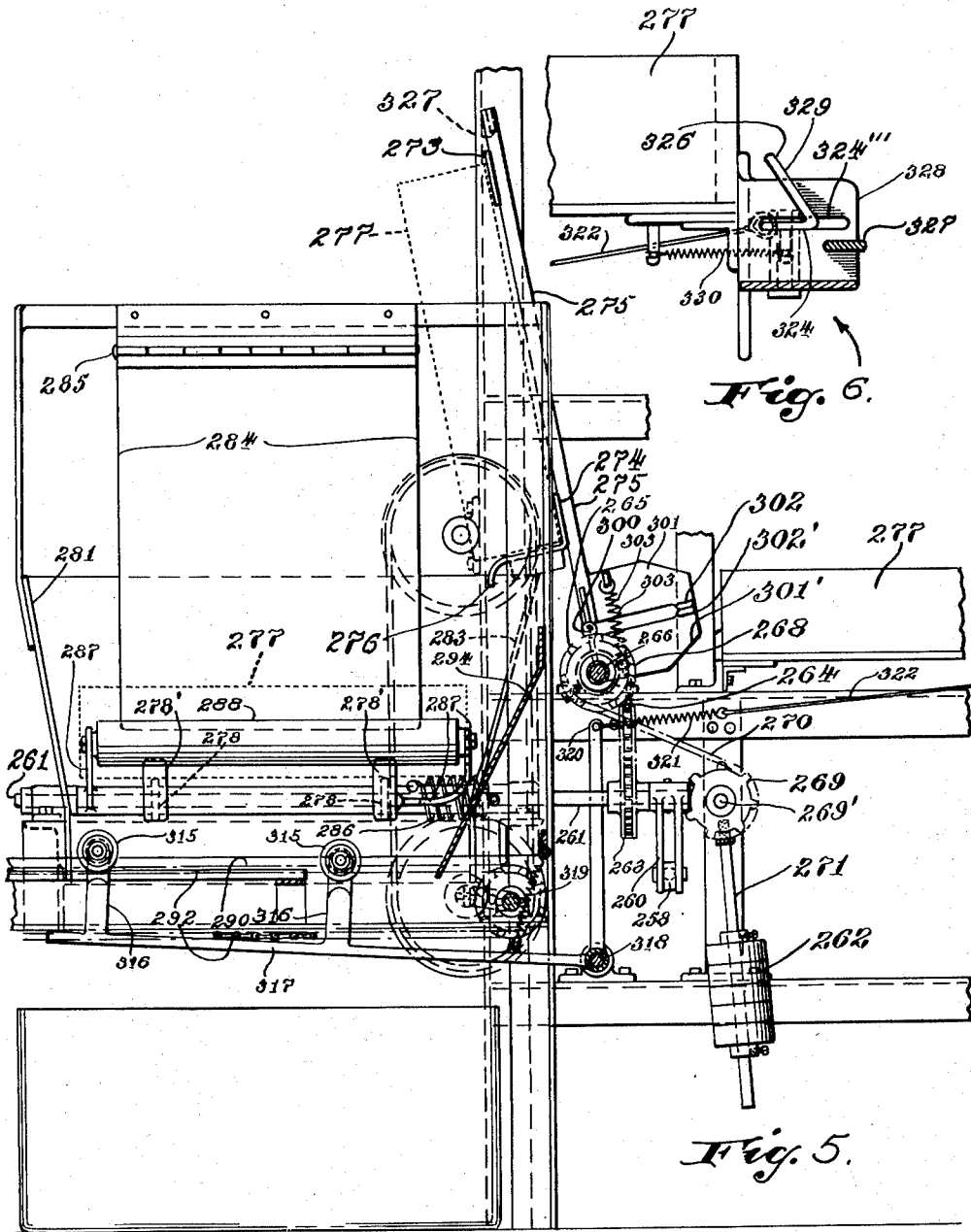
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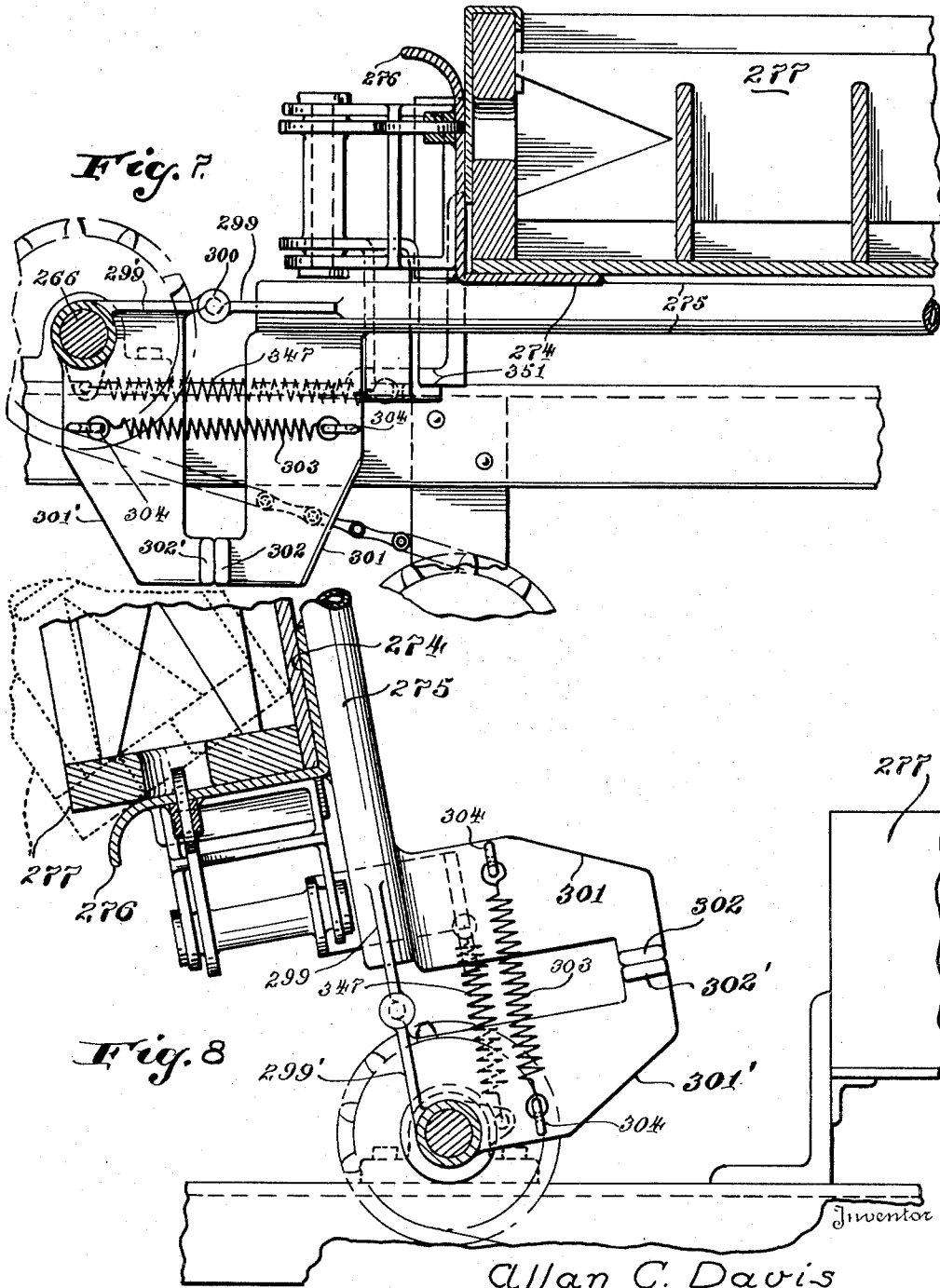
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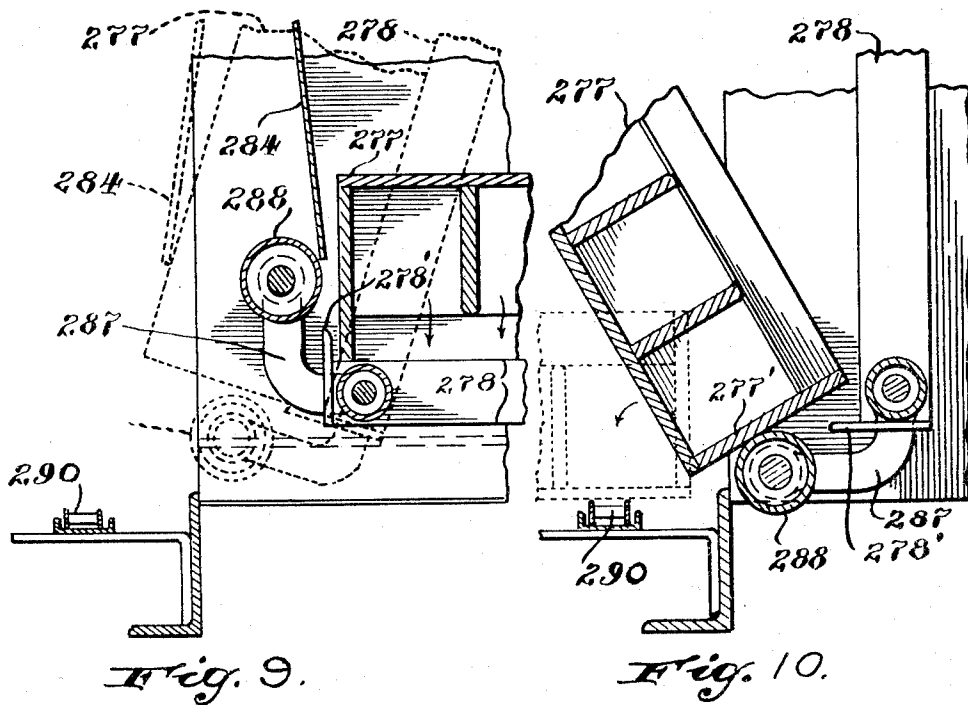
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UNITED STATES PATENT OFFICE

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BOTTLE CRATE SHAKER AND CLEANER

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20 Claims. (Cl. 214-1.1)

1

In the bottling of soft drinks, beer and other liquids packed in compartment cases, in which the empty bottles are returned, the removal of the bottles from the cases, and their introduction into the infeed of the bottle washing machine, has involved a hand operation. This operation is slow and expensive and notably inefficient. This hand operation slows down and in various ways reduces the efficiency of the line of machines by which the bottles are washed, filled, inspected and placed in the cases or crates.

The object accomplished by the invention, shown in the co-pending application, Patent No. 2,400,542, dated May 21, 1946, from which the present application is a division, is the provision of an automatic machine to be added to the previously existing line of machines, making it feasible to perform the entire cycle of operations in connection with bottling, case filling, washing and refilling, automatically and with the minimum of supervision. More particularly in the operation of that machine, the compartment cases as received from the retailer, each case containing empty bottles in a series of rows, are placed on a feeding conveyor which feeds the machine, and this machine operating automatically almost without supervision for long periods, lifts the bottles row by row including as few or as many bottles as presented, and places the bottles on a bottle conveyor, from which they are duly transferred to a multiple conveyor which constitutes the infeed of a bottle washing machine, which in turn delivers to a bottle filling machine. Each case is advanced during the period of removal of the bottles therefrom preferably with a step by step motion and in a direction transverse to the case conveyor, variation as to such details being contemplated. Thus each row of bottles is brought in turn within the range of pick up or gripping mechanism, and when each case is thus emptied of bottles it is thereafter advanced most conveniently in the direction of the case infeed to a case clearing mechanism forming the subject of this divisional application, whereby each case in turn is cleared of dirt and other debris, being for this purpose preferably inverted, and thereafter by a second turning operation returned to upright position on a delivery conveyor. There is in the initial inversion just sufficient abruptness of treatment to detach and discharge the dirt and debris without injuring the cases. As they are returned to upright position the cases are placed on a conveyor just referred to as the delivery conveyor, which with the infeed case conveyor

2

is to best advantage timed with the washer and the other machines of the line, particularly the case filling machine. The delivery conveyor according to the preferred arrangement feeds the cases directly to the case filling machine. The length and arrangement of the various intervening conveyors depends on the arrangement of the machines of the line.

In addition to the mechanism for accomplishing the functions above outlined the machine of the invention includes various protective devices to prevent damage to the cases and the piling up of the cases on the delivery conveyor which leads from the present machine to the case filling machine assuming that the present machine is one of a complete line as intended.

The line of automatic machines, to perform the complete bottling and case filling cycle referred to may include as at present intended, a bottle filling machine which delivers to an inspection apparatus and a case filling machine. The present machine would receive the returned cases containing empty bottles, the function of the machine of which this is a division being to remove the bottles from the cases and deliver the bottles to the intake of a washing machine which would in turn deliver the bottles to the bottle filling machine, and the present machine also clears the cases of dirt and debris and delivers the cases to a conveyor by which they are fed to the case filling machine.

In the accompanying drawings I have illustrated a machine embodying the invention in the preferred form, changes of design as to all parts of the machine being contemplated and the use of the various elements of the machine in the absence of the others or with other elements or assemblies being likewise contemplated.

In the drawings:

Figure 1 is a front elevation of the machine looking at the end at which the bottles and cases enter.

Figure 2 is a plan view of the rear end of the machine showing the turning or inversion and delivery of the cases.

Figure 3 is a side elevation looking from the left in Figure 1 showing the front end of the machine, the infeed case conveyor and support being in section.

Figure 4 is a similar elevation of the rear end of the machine.

Figure 5 is a rear end elevation looking from the left in Figure 2.

Figure 6 is a rear elevation of the turnover latch taken from line 6-6 in Figure 2.

Figure 7 is a section on the vertical plane showing the first turnover arm.

Figure 8 is a second sectional view showing the first case turnover mechanism in turnover position, in this instance the case is partially turned to inverted position.

Figure 9 is a section on the vertical plane indicated by line 9—9 in Figure 2 showing the second turnover mechanism with a case thereon ready to be turned to upright position on the case delivery conveyor.

Figure 10 is a section on the same plane showing the case turned beyond 90° position and ready to drop in upright position on the case delivery conveyor.

Referring to the drawings by numerals the frame of the machine is indicated in a general way by reference character 1.

The infeed of the cases from which the bottles are to be removed and the delivery of cases from the machine and other operations at the front end of the machine are preferably performed in time with the bottle washer and for this purpose these mechanisms are preferably connected to the motor 2 shown at the right in Figure 1 and are described in the above application.

In the form shown there is a worm drive 5 on or connected to the shaft of the motor. This worm drives the worm wheel 6, the shaft of which carries or drives a small sprocket 7, which in turn drives a chain 14 which engages and operates a sprocket 9 spaced upwardly above the sprocket 7. Sprocket 9 is an idler for spacing the flights of the chain.

After the filled cases have been advanced and as each case is emptied in the bottle take up position on rollers 31 and moves backwardly as each row of bottles is removed, it pushes the previously emptied cases backwardly through the machine forming a continuous line of cases moving through the machine to the case turn over and discharge at the rear end of the machine.

For this purpose the path of the cases through the machine backwardly from the bottle take up position is defined by a line of anti-friction rollers 81 arranged with their axes horizontal and transverse to the length of the machine. These rollers may be rotatively supported in a pair of angle irons 82 arranged in parallel and extending backwardly on each side of the path thus identified. These rollers are shown in end elevation in Figure 3.

In the form shown there are two sets of short rollers 81, one at each side of the path of the cases having their journals seated in the upright flanges of angle irons 82. In this way the center of the machine is made more accessible particularly from beneath. The extension of the rollers across the entire path of the cases is regarded as undesirable in the particular form of machine shown.

At the extreme forward end of said path of the cases just rearwardly of the bottle take up position on the rollers 31, supporting plate 83, see Figure 3, has been shown instead of anti-friction rollers and at the rear end of the path the drawing shows supporting plates 84, Figure 5.

At the extreme rear end of this path there is a case turning mechanism or assembly 85 whereby the cases are turned through an arc of 180° in a vertical plane at right angles to the direction of the path just described said plane being parallel to the axes of the anti-friction rollers 81.

The cases are thus placed in inverted position

on the second turn over mechanism, the second turn over assembly being indicated by reference character 86. This second turn over mechanism turns the cases through an arc of 180° in a vertical plane parallel to the path of the cases through the machine as on rollers 81 and plates 83 and 84. This second turn over assembly places the empty cases in upright position on a delivery conveyor 290 which in the preferred practice leads to the case conveyor of a case filling machine by which the filled bottles are loaded into the cases for delivery.

In the form of machine illustrated this delivery conveyor is of the chain type driven by sprockets 291 which are mounted on a shaft 293 which as shown is connected by universal joints 16''' and 16'' and shaft 16' to the shaft 16, the front end of which is shown in Figure 1 as having thereon sprocket 15 driven by chain 14 and cooperating sprockets 7 and 9 from the worm wheel 6 which is operated from the shaft of the motor 2 which drives the bottle washing machine to which the empty bottles are delivered by the machine under discussion.

The respective first and second case turning assemblies will be further discussed. It is of importance that in the first turning operation performed by assembly 85 in which the cases are inverted from upright position, they are handled with just sufficient abruptness to dislodge the dirt and debris collected during shipment and during the sale of the bottled goods and in returning the empty bottles and this handling is not sufficiently abrupt to destroy or injure the cases.

The second turn over 86 returns the cases to upright position and places them on the delivery conveyor ready to be presented to the case filling machine.

The handling and treatment of the empty cases, boxes or crates after they leave the bottle take up position on rollers 31 where the bottles are removed, will now be discussed.

As already pointed out the empty cases move rearwardly on rollers 81 or other conveyor, and in the form of the machine shown these cases normally form a continuous line with each case in side to side contact with the next. The anti-friction rollers 81, Fig. 2, support the line of cases and the step by step motion imparted to each case in turn in take up position on rollers 31, is communicated from this case to the one next to the rear and previously emptied and from this case to the next and so on through the entire line so that the entire line is moved with the same step by step motion. This arrangement is mainly for convenience and simplicity other case advancing means being usable.

At the rear end of the machine the cases are inverted with just the right degree of abruptness to dislodge and release the dirt and debris and thereafter each case is returned to upright position and advanced toward the case filling machine.

Cases which approach the turnover when there is a case on the turnover mechanism so that there is a tendency for the cases to pile up on the conveyor are discharged from the end of the line or otherwise prevented from entering the turnover mechanism in such close sequence with a case being turned as to cause or tend to cause piling up which in this connection means placing of one case on top of another on the discharge conveyor.

In Figure 1 there is shown a case turnover cam 250 mounted on cam shaft 207 also shown

at the upper right in Figure 3. This shaft as hereinafter described rotates once for each four or any suitable number of bottle row take up cycles, according to the number of rows in a case. Cam 250 engages a follower roller 251 mounted immediately of the length of an arm 252 shown as pivotally mounted at its upper end on a transverse shaft 253 supported in the top portion of the frame. Said arm swings in a fore and aft plane. This arm 252 is shown as bifurcated, straddling the cam 250 and the cam roller 251 is between the bifurcations. A connecting rod 254 partially supported by spring 259 is pivotally connected to the lower end of arm 252. The rod 254 extends downwardly and rearwardly and is connected at its lower end to the approximately horizontal arm 255 of a bell crank lever 256 having a fore and aft oscillating arm 257 shown as approximately upright. This arm 257 is connected at its swinging end to an elongated fore and aft extending connecting rod 258 which extends almost the entire length of the machine, being shown in Fig. 3 and at the rear of the machine in Figs. 2, 6 and 7. At its extreme rear end this connecting rod 258 is connected to and operates a crank 260 which is secured to a transverse shaft 261 which is oscillated by said crank once in each four bottle row lifting cycles, and in accordance with the present embodiment, after the stroke which removes the last row from each case. The follower 251 is in fact, in the form shown, held in contact with or caused to normally contact cam 250 by a weight 262 shown in the side elevation, Figure 6. The first case turn over operation to be described is in fact energized by the weight 262 and timed by the cam 250, i. e., the weight which is adjustable as to position on arm 271 or as to its amount to compensate for variation in weight of the cases is raised by the cam to a position from which it falls or swings downwardly turning the case and this downward swing of the weight and turning of the case is timed by cam 250.

More particularly the oscillating cross shaft 261 in the form shown has secured thereto a sprocket 263 oscillating in a fore and aft vertical plane and this sprocket is connected by a chain 264 to a sprocket 265 secured to and serving to oscillate a longitudinal shaft 266 which is in a higher horizontal plane than shaft 261, see Figs. 2 and 5. This chain is not endless but is secured at its opposite ends to the respective sprockets 263 and 265 and wrapped partially around same, the motion of both shafts being oscillatory and not rotary. Shaft 266 is similarly connected by sprockets 268 and 269 and a single chain 270 to the swinging weight 262 which is mounted on a radial arm secured to the latter sprocket which is mounted on a short shaft 269' having a single bearing in the frame. The said chain 270 has two ends, each end portion being secured to and wound partially about a corresponding sprocket. The mechanism just described connects the weight 262 to cam follower 251 and vice versa.

Weight 262 tends with some interruptions by mechanism to be described, to hold follower 251 in contact with cam 250. The weight 262 in swinging downwardly operates the first case turnover; cam 250 returning or raising the weight and returning the parts to initial position and the second turnover is operated directly by the cam as it raises the weight. The latter operation is therefore relatively positive, and said respective turnovers occur in sequence.

The cases in their progress through the machine form a closed line extending rearwardly, as described from the rollers 31 which support the cases in turn in take up position along plates 83, Fig. 3, rollers 81 and ways or plates 84, Figure 5, on which they are guided by the upright flanges or plates 82. As they reach and extend beyond the latter plates they rest on the case supporting or turning plates 273, 274 shown in broken lines in Fig. 2, and in full lines, Figure 4. These plates 273 and 274 are shown as mounted on a radial arm 275 connected to shaft 266 in a manner to be described. In the first turning operation, i. e., as each case is inverted, these plates swing upwardly about the axis of shaft 266 as it is oscillated by the downward swing of weight 262. This arm 275 is normally horizontal and is raised, preferably after each case is emptied or at suitable intervals as determined by cam 250 through the connections shown, or such other suitable connection as may be provided, the timing being essentially in correspondence with the emptying of the cases. It may be noted that plate 274 adjacent to shaft 266 has a normally upright fore and aft extending flange 276 which prevents the case 277 thereon from sliding toward shaft 266 as the case is turned upwardly.

The arm 275 in the form shown has a hinged or other swinging relation to the shaft 266 having stop means whereby it is prevented from yielding backwardly or downwardly beyond a predetermined position under the weight of the case being turned, and springs for restraining and opposing its forward motion holding it normally in backward position against the stop. As pointed out the lifting or initial 90° swing of the first turning motion is imparted by weight 262 and therefore cannot crush the cases if they should become jammed in this part of the turning operation. On the other hand if by any chance a case should advance on ways 84 beneath the arm 275 the arm yields upwardly without harmful result.

The mechanism shown is as follows. Plate 299 approximately radially related to shaft 266, see Fig. 7, has the arm 275 rigidly secured thereto or integral therewith. This plate 299 is connected to a plate like lug 299' carried by shaft 266 by hinge 300 having its axis parallel to shaft 266. Both plates 299 and 299' have projecting fins or webs 301 and 301' transverse to said plates 299 and 299' and shaft 266, see Figs. 2 and 4. The fins 301 and 301' project downwardly when arm 275 is horizontal, see Fig. 7. Fin 301' is rigid with shaft 266 and fin 301 with arm 275, see Figs. 4, 5, and 7 and these fins have near their radially outer ends stops or stop plates 302 and 302' which are held normally in contact by tension springs 303 one on each side of said fins 301, 301'. Said springs are connected at each end to lugs 304 projecting from fins 301 and 301' respectively and tend to hold stops 302 and 302' in contact each with the other. Springs 303 thus tend to hold arm 275 in normally fixed relation to shaft 266 and permit it to yield in left handed rotation as seen in Figure 5. Stops 302 prevent arm 275 from yielding downwardly in the lifting operation giving it a normally fixed relation to shaft 266 providing for a positive lifting of the case by weight 262, which prevents crushing in case of obstruction of the case turning path, and the spring connection provides for an upward or forward yielding of arm 275 when the downward motion of the arm 275 is obstructed as by the premature advancement of a case beneath said arm.

To prevent irregular or premature advancement of cases into said position and to keep a full line of cases on ways 84 and rollers 81 a case brake 306 has been provided shown in plan, Figure 2. This brake, as shown, the details of the various mechanisms being subject to variation consists of a brake shoe 307, extending in a fore and aft direction of the machine, i. e., parallel to said step by step motion, and having its case contacting face 307' similarly disposed. This brake shoe as shown is pivotally mounted near its fore and aft center on a lever 308 which swings horizontally and transversely of the machine being in turn pivotally mounted on the frame 1 at 309 at its forward end. The lever 308 carrying shoe 307 is yieldingly advanced by a spring 310 shown as enclosing a sliding guide rod 311 which also limits the advancement of this lever 308 and shoe 307.

The second turnover as shown comprises arms 278 extending in a direction which is longitudinally related to the machine. These arms are mounted on and radiate from a sleeve 280 on transverse horizontal shaft 261. These arms in their horizontal or depressed position as shown in Figure 2 are at the bottom of a case guiding funnel 279 which is shown as having three rigid sides 281, 282, 283 and a swinging transverse side 284 forming the rear side of said funnel. This member 284 is pivotally or hingedly supported at its upper edge at 285 on a rigid portion of the frame 1 whereby the said flap or funnel side 284 swings in a fore and aft direction as related to the passage of the line of cases through the machine. The sleeve 280 carrying the arms 278 is flexibly connected by coil spring 286 to shaft 261 on which the said sleeve is mounted and said sleeve is provided with offset or other suitable arms 287 which may be integral with arms 278 and at right angles thereto extending upwardly when arms 278 are depressed or horizontal. These latter arms 287 carry at their swinging ends a transverse fulcrum roller or equivalent member 288 on the forward side of which the bottom edge of flap 284 rests in the position of roller 288 and arms 278 just described and also shown in Figs. 2, 4 and 5 in which figures it may be noted that the first turnover arm 275 as shown in full lines is elevated, i. e., is at or near the end of the first turning operation. At this time arms 278 are in horizontal position to receive the case thus turned and roller 288 which swings about shaft 261 in the 90° relation shown in Fig. 4 is elevated, holding the flap 284 or rearward wall of funnel 279 in the forwardly and downwardly inclined position shown, whereby the inverted case will be guided downwardly to arms 278. The case is thus turned through the first 180° of the turning operation being dropped with emphasis on the arms 278 tending to remove all dirt and debris.

It will be noted from Figure 4 that the depending arm 260 of transverse shaft 261 is in its rear-most position which corresponds to the position of first turnover arm 275 and second turnover arms 278 and roller 288 as therein shown. In this position the first turnover arm 275 is beyond the upright at the end of its stroke ready to drop the case 277 in inverted position and the second turnover arms 278 are horizontal ready to receive the turned case. It may also be noted that cam follower roller 251, Figure 3, is in the corresponding depression of cam 250 and the line of cases 73, 73' is stationary as follower 56 approaches shoe 55. Continued rota-

tion of said cam expels the follower 251, drawing the connecting rod 258 forwardly, i. e., to the right of Figs. 4 and 5 effecting a corresponding motion of arm 260 and shaft 261 and hence of shaft 266 through the connections previously described.

Thus arm 275 is lowered to horizontal position in which case turnover supporting plates 273 and 274 are in line with the case ways 84 and ready to receive another case 277 advanced by the step by step motion. At the same time and by the same motion of crank 260 and shaft 261, which in the particular mechanism shown is actuated by cam 250 through spring 286, and the positive connection described, the arms 278 are raised to upright position in the second turnover operation, again turning the case 277 through 180° so that it is returned from its bottom up position, in which it was received on arms 278, to normal or bottom downward position on the case delivery conveyor 290, which in the line of machines previously described would deliver the cases directly or indirectly to a case filling machine. This conveyor is shown as transversely related to the line of cases in the present machine.

The roller 288 swings rearwardly and downwardly as the second turnover arms 278 swing upwardly said fulcrum being spaced upwardly from arms 278 in the horizontal position of the latter and 90° therefrom in an arc about shaft 261. Lugs 278' are slightly forward of rollers 288 in the horizontal position of arms 278. As the said arms are raised to or slightly beyond the vertical, the rear lower corner of the case rests in the angle between said lugs and arms and the case rocks about this corner its rear side wall 277' turning with and about said fulcrum 288. As roller 251 again enters the depression of cam 250, and arms 278 return to the horizontal position which occurs when another case has been emptied, roller fulcrum 288 swings back to the position Figure 4 in which the arms 287 on which it is supported are upright and said detent or roller is above the supporting plane of arms 278. In this position the flap or hinged plate 284 is in the case guiding position, Figure 4, from which it swings to the left releasing the case as the fulcrum 288 swings downwardly to the left in Figure 4 in the second turning operation.

As each case approaches the conveyor 290 it receives an impetus in the direction of advancement of said conveyor 290 from the inclined plate or chute 294 which is inclined downwardly and forwardly in the direction of motion of conveyor 290 as indicated by the arrow thereon. This impetus serves to overcome the inertia of each case in turn and to prevent slipping of the cases on the conveyor 290, whereby each case in turn moves forwardly with conveyor 290 giving a relatively uniform initial advancement of each case whereby piling up of cases at this point is prevented and the cases are located on the conveyor end to end without shock. It is of importance that each case 277 is inverted in the initial turning operation and landed in inverted position with sufficient abruptness to dislodge the dirt and debris which is thus discharged and spilled downwardly but is not handled with sufficient violence to damage the cases through a long period of use. The turning to upright position on the conveyor is performed immediately but preferably without excessive abruptness.

Conveyor 290 may be timed and operated in

any suitable manner. In the form shown, see Figure 2, it is operated by shaft 16 driven from and in time with the bottle washing machine motor and hence in time with said washing machine which should be timed with the other machine of the line. Shaft 16 extends rearwardly from the front of the machine as previously described. In the form shown this shaft carries at its rear end a pulley 296 driving a belt 296' which drives a pulley 297, Figure 5, on a short shaft 298 supported in a suitable bearing 298' on the frame 1. This shaft is connected by a universal joint 16'' to a shaft 16' and a similar joint 16''' at its rear end provides a driving connection to conveyor sprocket shaft 293 which carries and drives conveyor sprockets 291 which drive the chains 292 of said conveyor 290. Conveyor 290 is shown as having side guides 295 and 295' in the form of angle irons, shown in plan, Figure 2. The outer guide 295' carries a downwardly and forwardly inclined funnel plate 295''.

Figure 2 shows in plan and Figure 5 in rear elevation a detector mechanism operating a stop motion whereby the turnover operation is deferred when there is a case on conveyor 290 in the receiving position to which the cases are discharged from the second turnover arms 278. When the first turnover operation is thus deferred the case fed rearwardly from ways 84 over the turnover plates 273, 274 is passed rearwardly and caused to go beyond said plates 273, 274 being thus discharged from the machine and dropped as in Figure 2. This prevents piling up of cases on the conveyor 290. It is of interest that the difficulty referred to and hence this discharge of cases is of infrequent occurrence amounting to usually one or two cases a day. The discharge of such a small proportion of the cases is insignificant, there being a corresponding consumption of bottles due to breakage by dropping from the various conveyors between the machines of the line and to removal during inspection, etc.

This detector and safety discharge device for the cases, in the form shown, comprises detector member or roller 315, see Figures 2 and 5. These detectors or detector rollers 315 are shown in Figure 5 as mounted on uprights 316 carried by and extending upwardly from a transverse swinging arm 317, radiating from and secured to a longitudinal shaft 318. This arm 317 is normally supported by a spring 319 which gives it a yielding upward tendency whereby rollers or detector members 315 normally project upwardly between the chains 292 of case delivery conveyor 290. The shaft 318 also carries rigidly secured thereto or integral therewith an upright arm 320 yieldingly connected at its upper end as by light tension spring 321 and connecting rod 322 to a fore and aft extending latch lever 324 shown as mounted to swing in a horizontal plane about a central pivot 325 projecting upwardly from a horizontal plate 324' secured to the frame. Lever 324 has at its rear end a detent 326, adapted to engage a forwardly extending lug 327 on the first case turnover arm 275 as best shown in Figure 4. The latch lever 324 is moved in latching direction, i. e., to right in Figure 6, by said spring 321 and rod 322 and arm 320 as hereinafter described.

The latch 326 is shown in transverse sectional elevation looking forwardly in Figure 6 being shown in released position, i. e., lever 275 is in lowered or horizontal position and latch 326 has been advanced from its engaged position to the

left in Figure 6 which is away from the observer in Figure 2.

It may be noted that latch lever 324 swings in a slot 324''' in a transverse plate 328 secured to the frame, Figures 2 and 6. In the form shown detent 326 on lever 324 has a cam surface 329 which, when engaged by the lug 327 on turnover lever 275 in the return or downward stroke of the latter moves latch lever 324 to the left in Figures 5 and 6 out of the path of lug 327 permitting the lever 275 to move to its fully depressed or horizontal position as in an instance when there is a case on rollers 315 when the lever 275 reaches the end of its return stroke and is ready to receive a case. This latch 324, 326, 327 is normally released by spring 330, Figures 2 and 6 which tends to hold the parts in the position, Figure 6, spring 319 assisting.

It is of interest that as stated in the description and shown in the drawing of cam 250 that the first and second turnover operations take place in the machine shown in quick succession and that if the first turnover operation takes place when there is a case on conveyor 290 in the position in which it overlies the rollers 315, there is danger of piling the cases one on top of the other on said conveyor. The tendency to piling up is obviously harmful in its effect on the case filling machine operation and is eliminated by the case detector, turnover latch mechanism. Whenever there is a case on conveyor 290 in the position described rollers 315 and lever arm 317 are depressed by the weight of the case stretching spring 319 which is of suitable tension for this purpose. Also the shaft 318 is turned to the left by arm 317 as seen in Figure 5 and upright lever 320 is turned counterclockwise in Figure 5. This applies tension to spring 321 and rod 322, swinging the latch lever 324 counterclockwise as seen in plan, Figure 2, stretching spring 330 which tends to hold the latch lever 324 in the position shown in Figure 6. The counterclockwise motion of lever 324, see Figures 2 and 6, engages the latch 326 with lug 327 on lever 275 and the latch remains engaged so long as there is a case in the position overlying rollers 315. As soon as this case on rollers 315 is advanced or removed, if it should prove to be jammed, rollers 315 and lever arm 347 rise by action of the springs 319, 330 and 321 and latch 324, 326, 327 is released.

In the meanwhile the advancement of the cases would normally continue, the case or the successive cases at the rear end of the line being pushed over and off of turnover plates 273, 274 on to the floor or into a receptacle suitably placed so long as the latch remains engaged.

When the obstruction or jammed case on the ways 290 which is engaging rollers 315 is removed or advanced the turnover latch is released and the regular operation of the machine is continued. One purpose of this detector controlled latch is to prevent piling up of the cases on the delivery conveyor in case of a stoppage or slowing down of the case filling machine and a consequent failure to take cases from case delivery conveyor 290. The intake end of the machine and the delivery conveyor are intended to be so timed as to keep the washer full of bottles.

It is regarded as of advantage in connection with the first and second case turning operation that the respective case turn over arms or levers swing to a position only slightly beyond the vertical, in the form shown about 15° and the upper edge of the case in this position being the outer edge in a radial direction from the axis of the

arm upon which the case is being turned has a greater momentum than the opposite or inner edge the rotation of the case about said inner edge continues until the case is turned through a 180° angle and falls free of the turnover fulcrum support 276 in the first turn over and 288 and 278' in the second turnover.

Figure 8, 9 and 10 illustrate the rolling of the cases about said fulcrums and Figure 9 also illustrates in full and broken lines respectively the successive positions of hinged plate or funnel side 284 and roller 288. The latter is lowered releasing said member 288 and hence the case as the turning operation progresses.

I have thus described a machine embodying the invention, the description being specific and in minute detail in order that the construction and operation of a machine embodying the various features of the invention may be fully disclosed for the benefit of those familiar with case filling and similar machines and hence able to understand this machine: however the specific terms herein are used in a descriptive rather than in a limiting sense, the construction disclosed being regarded as a practical embodiment of the invention of which other forms are contemplated.

What I claim as new and desire to secure by Letters Patent is:

1. In a machine of the type described, the combination of means for moving open top cases on a predetermined path, means adjacent said path to lift the cases from said path and to turn the cases to inverted position to remove dirt therefrom, means in receiving relation to said turning means to receive the cases from said turning means and to again turn the cases, turning them to upright position and a conveyor in receiving relation to said second turning means to deliver cases from said second turning means, means to detect the presence of cases on said case delivery conveyor in the position in which they are received thereon and means controlled by said detector to delay the operation of the first said turning means, while permitting the continued operation of said first named means and the moving of cases on said path, thereby preventing accumulation of cases on said conveyor.

2. In a machine of the type described having a bottle case support, and means for advancing the cases from the support on a path, the combination of means adjacent said path for turning and inverting the cases, an oscillating member adjacent said turning means mounted to move from an initial receiving position to an approximately vertical position for receiving said cases in inverted position and returning the cases to upright position to which position the case swings by gravity from said member in vertical position, said oscillating member having a guide for the cases adapted to receive the cases and lead the cases from said first turning means to the oscillating member in its initial position, said guide leading downwardly to said member, and comprising a depending member swingably mounted approximately parallel to the axis of the oscillating member, near the upper end of said guide to swing outwardly and a case fulcrum member having a support projecting upwardly from a location near the axis of the oscillating member in the initial turning position of said member, said support being connected to said oscillating member, to oscillate therewith carrying said case fulcrum member which supports

the lower end of said swinging depending member as the case passes to the initial turning position, said depending member being released by the downward motion of said fulcrum member to swing freely, thus permitting the case to rock over said fulcrum member as the case swings from the oscillating member near the upright position of the latter in returning the case.

3. In a machine of the type described having a bottle case support, and means for advancing the cases from the support on a path, the combination of means adjacent said path for turning and inverting the cases, an oscillating member adjacent said turning means mounted to move from an initial receiving position to an approximately vertical position for receiving said cases in inverted position and returning the cases to upright position, said oscillating member having a guide for the cases adapted to receive the cases and lead the cases from said first turning means to the oscillating member in its initial position, said guide leading downwardly to said member, and comprising a depending member swingably mounted approximately parallel to the axis of the oscillating member, near the upper end of said guide to swing outwardly and a case fulcrum member having a support projecting upwardly from a location near the axis of the oscillating member in the initial turning position of said member, said support being connected to said oscillating member, to oscillate therewith carrying said case fulcrum member which supports the lower end of said swinging depending member as the case passes to the initial returning position, said member being released by the downward motion of said fulcrum member to swing freely, thus permitting the case to rock over said fulcrum member as the case swings from the oscillating member near the upright position of the latter in returning the case, and a stop for the forward bottom edge of the case, adjacent said fulcrum member and connected to move with the oscillating member and projecting upwardly from the plane of the latter in its initial receiving position.

4. In a machine of the type described having a bottle case support, and means for advancing the cases from the support on a path, the combination of means adjacent said path for turning and inverting the cases, an oscillating member adjacent said turning means mounted to move from an initial receiving position to an approximately vertical position, for receiving said cases in inverted position and returning the cases to upright position, said oscillating member having a guide for the cases adapted to receive the cases and lead the cases from said first turning means to the oscillating member in its initial position, said guide leading downwardly to said member, and comprising a depending member swingably mounted approximately parallel to the axis of the oscillating member, near the upper end of said guide to swing outwardly and a case fulcrum member having a support projecting upwardly from a location near the axis of the oscillating member in the initial turning position of said member, said support being connected to said oscillating member to oscillate therewith carrying said case fulcrum member, which supports the lower end of said swinging case guiding member as the case passes to the initial returning position, said member being released by the downward

13

motion of said fulcrum member to swing freely, thus permitting the case to rock over said fulcrum member as the case swings from the oscillating member near the upright position of the latter in returning the case, the axis of the first turning means being approximately parallel to said path and the axis of the returning means being transversely related thereto.

5. In a machine for clearing debris from cases, means for inverting the cases, turning them about a normally upright side of each case, said inverting means having a releasing position, means having a receiving position lower than said releasing position for returning the cases to upright position, means for guiding the cases downwardly from said releasing position to said returning means in its receiving position, said guide means having a guide member mounted near the upper end of said guide to swing approximately in the plane of the returning motion of the cases, and located in the path of the swinging edge of the case in said returning operation for checking the returning motion and guiding the cases in upright position to a point of delivery from said returning means.

6. In a machine of the type described, the combination of yieldable power operated means for lifting empty cases and turning them about an axis through an angle approaching 180 degrees to remove dirt and debris therefrom, with a yielding variable force, the force being varied according to the weight of cases desired to be turned, said force yielding and failing to invert with a substantially overweight case, separate means for thereafter receiving the cases from said turning means in inverted position and returning them to upright position.

7. In a machine of the type described, the combination of means for turning empty cases approximately about an axis through an angle approaching 180 degrees to remove dirt and debris, one normally upright side of said case being parallel to and adjacent to said axis, means for thereafter receiving the cases from said turning means in inverted position and returning them to upright position about an axis transverse to said first mentioned axis, another normally upright side of said case which is at right angles to said first mentioned side being adjacent and parallel to said second axis, said latter means comprising a fulcrum member connected to said returning member to move therewith and being elongated in parallelism with said transverse axis and spaced above the transverse axis at the beginning of the returning operation and connected to said returning means to swing therewith in supporting relation to the side of the case which is downward in turning, and a depending swinging guide in the path of the cases at the end of the returning operation, to be alternately engaged being thus held in the path of the case, and later released, by said member, yielding to the swinging edge of the case in the last part of the returning motion.

8. In a machine of the type described, the combination of means for turning empty cases about an axis adjacent and parallel to one normally upright side of the case through an angle to remove dirt and debris by gravity, oscillating means for thereafter receiving the cases in inverted position and returning them to upright position about an axis transverse to said first mentioned axis, another side of said case which is normally upright and which is at right angles to said first mentioned side being parallel

14

to and adjacent to said last mentioned axis, said latter means comprising a fulcrum member spaced above the said transverse axis at the beginning of the returning operation and connected to said returning means to swing therewith moving downwardly as returning progresses, and upwardly on the return stroke of the oscillating means, and a swinging guide supported on and depending from an axis above said transverse axis, and supported at its lower end on said fulcrum in the initial returning position of said returning means, to be released and swung outwardly in contact with the case in the last part of its returning motion as said fulcrum member swings downwardly.

9. A case turnover comprising ways along which rectangular cases are intermittently fed, periodically operating means extending in said ways to lift the cases from said ways and turn them upside down, means adjacent said turning means to receive said cases from said turning means and to turn them right side up, conveyor means adjacent said second turning means to receive the cases when turned right side up, detector means in the path of said cases when received on said conveyor means to indicate whether the preceding case has moved from the upright position on said conveyor means, the operation of said detector means by a case preventing the operation of said first turning means when the preceding case has not moved from the uprighting position of the second turnover means on the conveyor while permitting the continued feeding of cases along said ways.

10. A case turnover comprising ways along which rectangular cases are intermittently fed, lifting means in the path of cases on said ways across which cases may slide and be discharged from the ways, yielding means to turn said lifting means to case inverting position, turning means to receive said inverted cases and to turn them to upright position, a conveyor receiving said cases when so turned to upright position and means in the path of said cases when so turned to upright position to prevent the operation of said lifting means and cause the discharge of cases therefrom when a preceding case has not moved from said upright position on said conveyor.

11. A case turnover comprising ways along which cases are intermittently fed, a receiving conveyor, means in part beneath and in part located between said ways and conveyor to invert the case and upright it on the conveyor, means to restrain the inverting action of the inverting means beneath the ways to permit cases to pass over the inverting means and from said ways without being inverted, means on the conveyor in the path of the case movement to upright position to detect the presence there of the preceding case, said detector actuating said restraining means to prevent the delivery of cases to the conveyor, to prevent the piling up of cases on the conveyor.

12. In a machine of the type described, a case turner comprising an arm having a horizontal receiving position, means for delivering a case to a position in which it is supported on the arm and means for swinging the arm to approximately upright position to turn the case, the arm having a pivotal support about which it turns to said upright position, a fulcrum member for supporting the case as it turns, said member projecting upwardly from the arm adjacent the axis of said pivot when the arm is

15

horizontal and swinging downwardly in supporting relation to a normally upright side of the case, when the case turns upwardly with the arm, whereby the case swings downwardly by gravity to an inverted position, a swinging depending case guide member, swinging about an axis approximately parallel to the axis of said arm, and depending from a support near the top of the path of the case, said member contacting and being initially retarded by said fulcrum member and being released as the fulcrum member moves downwardly, said member first checking the case as it swings by the 90° upright position and then releasing it to complete the turn.

13. A case turnover for turning a case through an angle of 360° comprising, first and second swingable members both positioned to receive a case in horizontal position and turn it to substantially vertical position and then release it, to turn by momentum and gravity through the balance of 180°, the second swingable member being adjacent and receiving the case from the first, and completing the turn through 360° and means to return said first swingable member to horizontal position and to simultaneously swing said second swingable member from horizontal position in the turning of a case.

14. A case turnover for turning a case through an angle of 360° comprising, first and second swingable members both positioned to receive a case in horizontal position and turn it to substantially vertical position and then release it, to turn by momentum and gravity through the balance of 180°, the second swingable member being adjacent and receiving the case from the first, and completing the turn through 360°, means to return said first swingable member to horizontal position and to simultaneously swing said second swingable member from horizontal position in the turning of a case and a conveyor adjacent said second swingable member, to receive and convey a case therefrom.

15. A case turnover for turning a case through an angle of 360° comprising, first and second swingable members both positioned to receive a case in horizontal position and turn it to substantially vertical position and then release it, to turn by momentum and gravity through the balance of 180°, the second swingable member being adjacent and receiving the case from the first, and completing the turn through 360°, means to return said first swingable member to horizontal position and to simultaneously swing said second swingable member from horizontal position in the turning of a case and a guide between said first and second swingable members to guide a case, in its fall from the first swingable member, to the second.

16. A case turnover for turning a case through an angle of 360° comprising, first and second swingable members both positioned to receive a case in horizontal position and turn it to substantially vertical position and then release it, to turn by momentum and gravity through the balance of 180°, the second swingable member being adjacent and receiving the case from the first, and completing the turn through 360°, means to return said first swingable member to horizontal position and to simultaneously swing said second swingable member from horizontal position in the turning of a case, a conveyor adjacent said second swingable member, to receive and convey a case therefrom, and means

16

associated with said conveyor to prevent the swinging of the first swingable member in the event of the absence of a free space on the conveyor to receive a case from the second swingable member.

17. A case turnover for turning a case through an angle of 360° comprising, first and second swingable members both positioned to receive a case in horizontal position and turn it to substantially vertical position and then release it, to turn by momentum and gravity through the balance of 180°, the second swingable member being adjacent and receiving the case from the first, and completing the turn through 360°, means to return said first swingable member to horizontal position and to simultaneously swing said second swingable member from horizontal position in the turning of a case, and conveying means to pass cases horizontally to said first swingable member, said conveying means being adapted to carry the cases beyond said first swingable member.

18. A case turnover for turning a case through an angle of 360° comprising, first and second swingable members both positioned to receive a case in horizontal position and turn it to substantially vertical position and then release it, to turn by momentum and gravity through the balance of 180°, the second swingable member being adjacent and receiving the case from the first, and completing the turn through 360°, means to return said first swingable member to horizontal position and to simultaneously swing said second swingable member from horizontal position in the turning of a case, a conveyor adjacent said second swingable member, to receive and convey a case therefrom, conveying means to pass cases horizontally to said first swingable member, said conveying means being adapted to carry the cases beyond said first swingable member and means associated with said conveyor to prevent the swinging of the first swingable member in the event of the absence of a free space on the conveyor to receive a case from the second swingable member, said conveying means then carrying the cases beyond said first swingable member.

19. A case turnover for turning a case through an angle of 360° comprising first and second pivoted swingable members with case retaining projections thereon, both positioned to receive a case in horizontal position and turn it to substantially vertical position where it is partially held by said projections, and then release it, to turn by momentum and gravity through the balance of 180°, the second swingable member being adjacent and receiving the case from the first, and completing the turn through 360° the projection on the first swingable member when the member is substantially vertical, being substantially above the second swingable member, when horizontal, to drop the case from a height thereto and means to return said first swingable member to horizontal position and to simultaneously swing said second swingable member from horizontal position, in the turning of a case.

20. A case turnover for turning a case through an angle of 360° comprising first and second pivoted swingable members with case retaining projections thereon, both positioned to receive a case in horizontal position and turn it to substantially vertical position where it is partially held by said projections, and then release it,

to turn by momentum and gravity through the balance of 180°, the second swingable member being adjacent and receiving the case from the first, and completing the turn through 360° and a conveyor adjacent said second swingable member, to receive and convey a case therefrom, the projection on the second swingable member, when the member is substantially vertical, being adjacent said conveyor, to drop the case lightly thereon and means to return said first swingable member to horizontal position and to simultaneously swing said second swingable member from horizontal position, in the turning of a case.

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5

10

15

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