

Nov. 12, 1968

J. A. JOHNSON
CASE FILLING MACHINE

3,410,047

Filed June 10, 1966

4 Sheets-Sheet 1

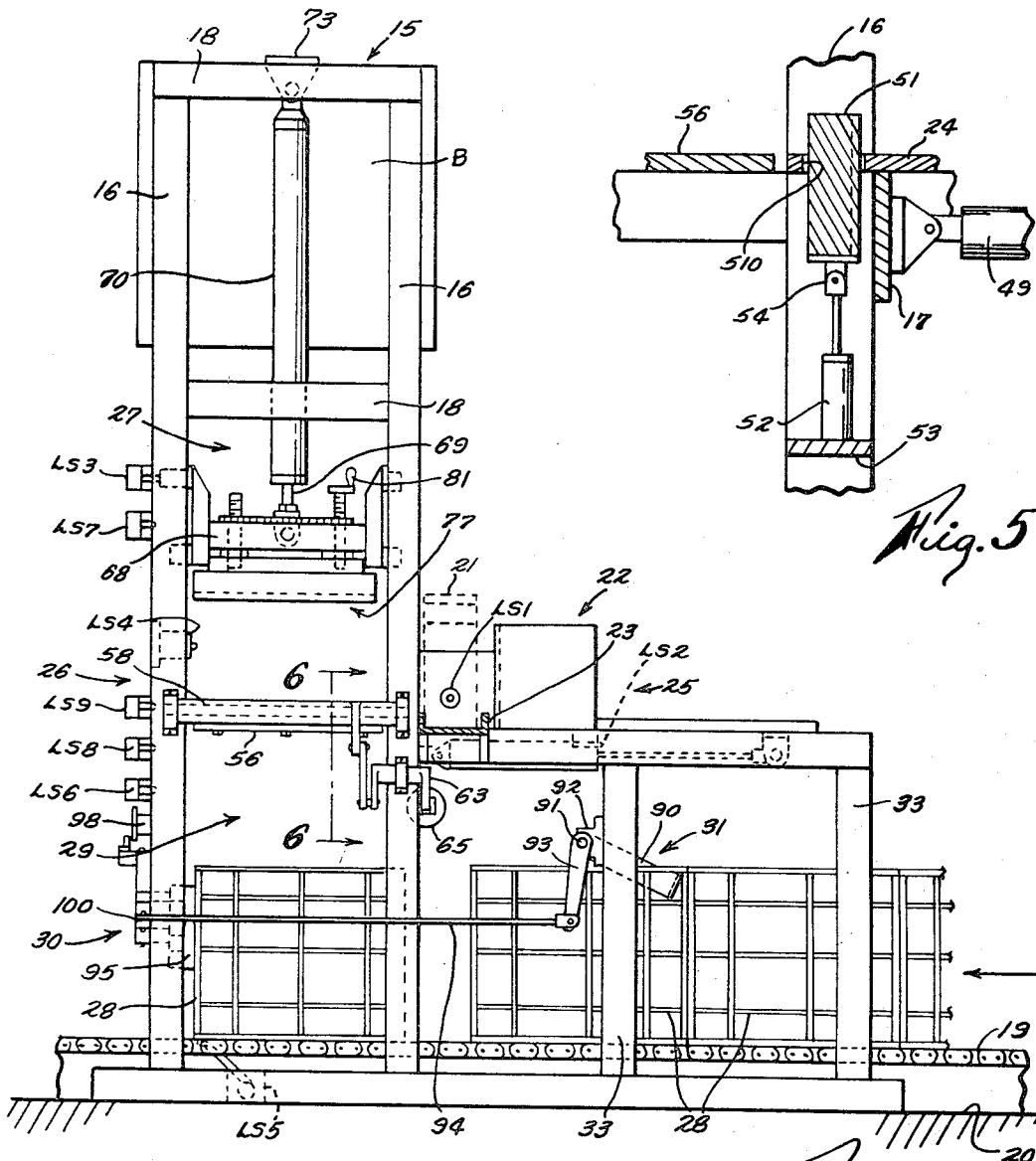


Fig. 5

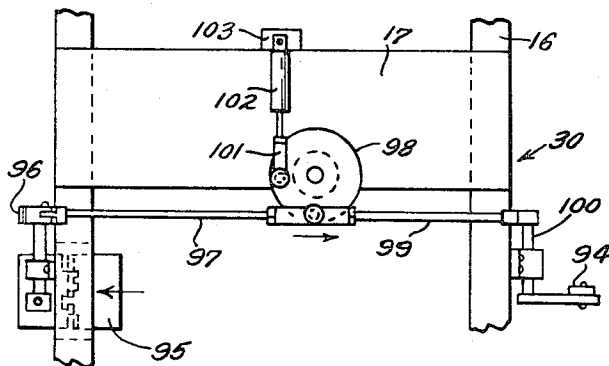


Fig. 10

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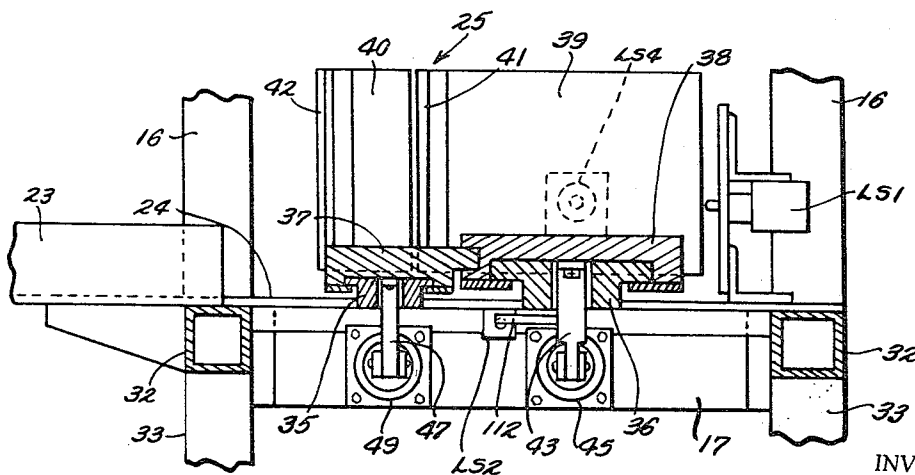
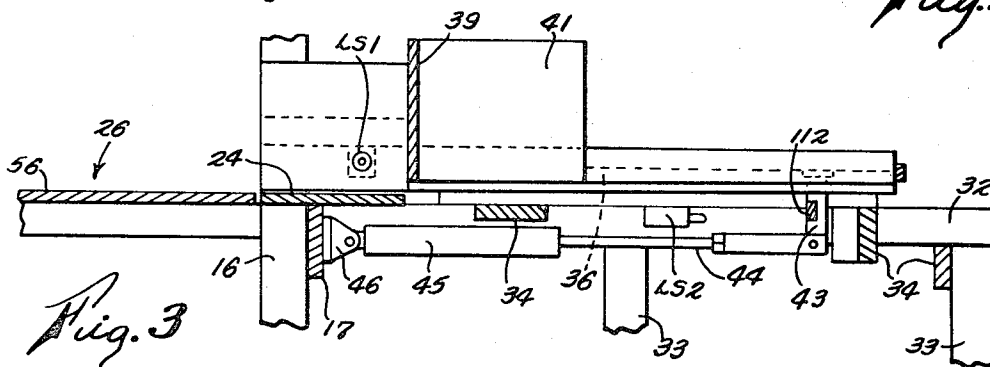
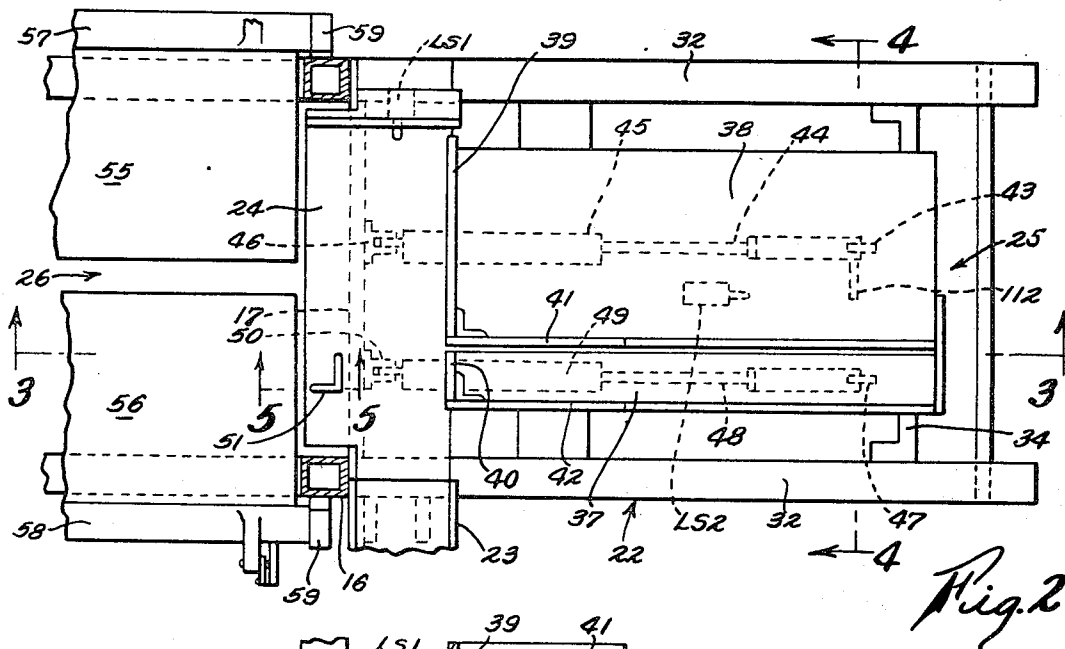
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4 Sheets-Sheet 2



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4 Sheets-Sheet 3

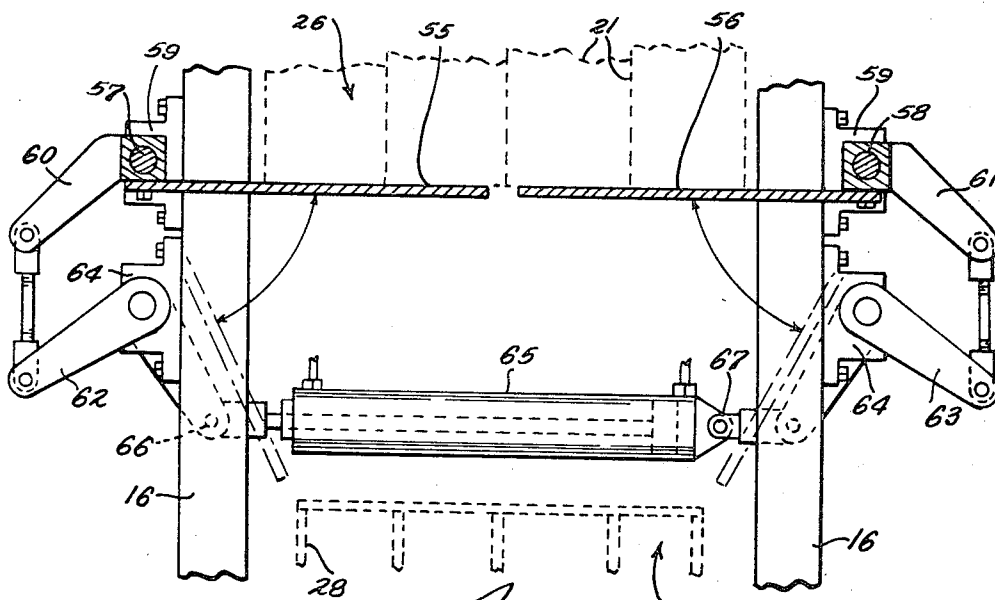


Fig. 6

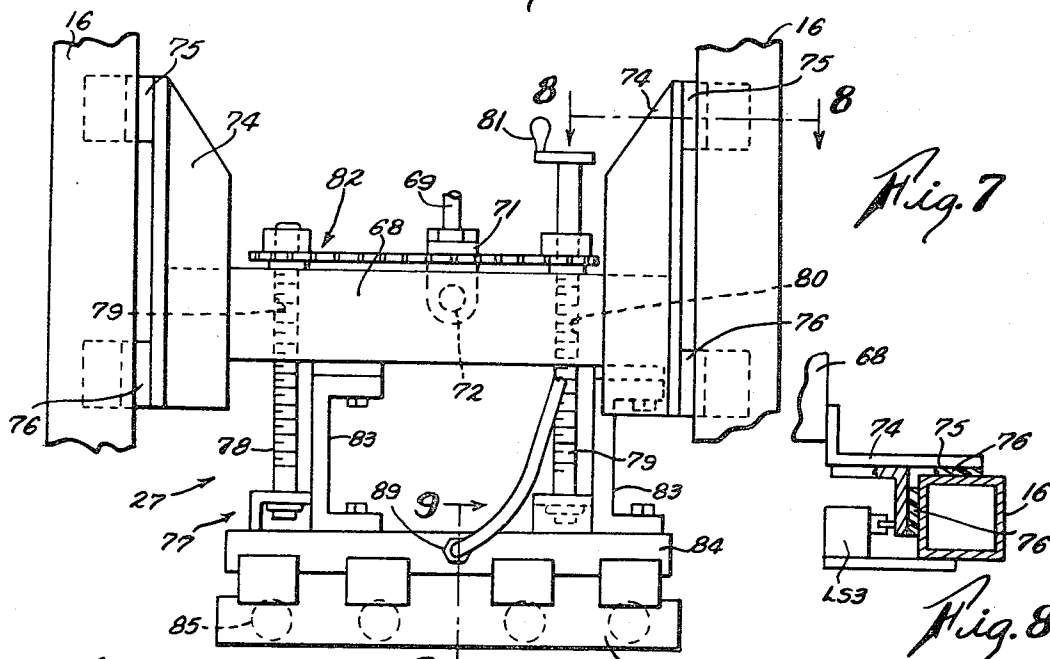


Fig. 7

Fig. 8

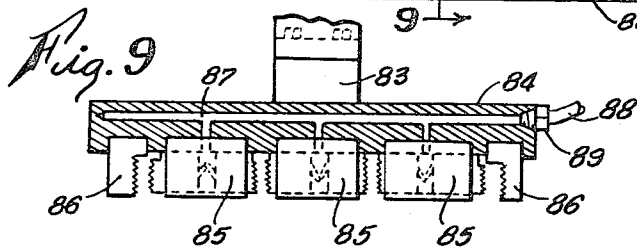


Fig. 9

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CASE FILLING MACHINE

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4 Sheets-Sheet 4

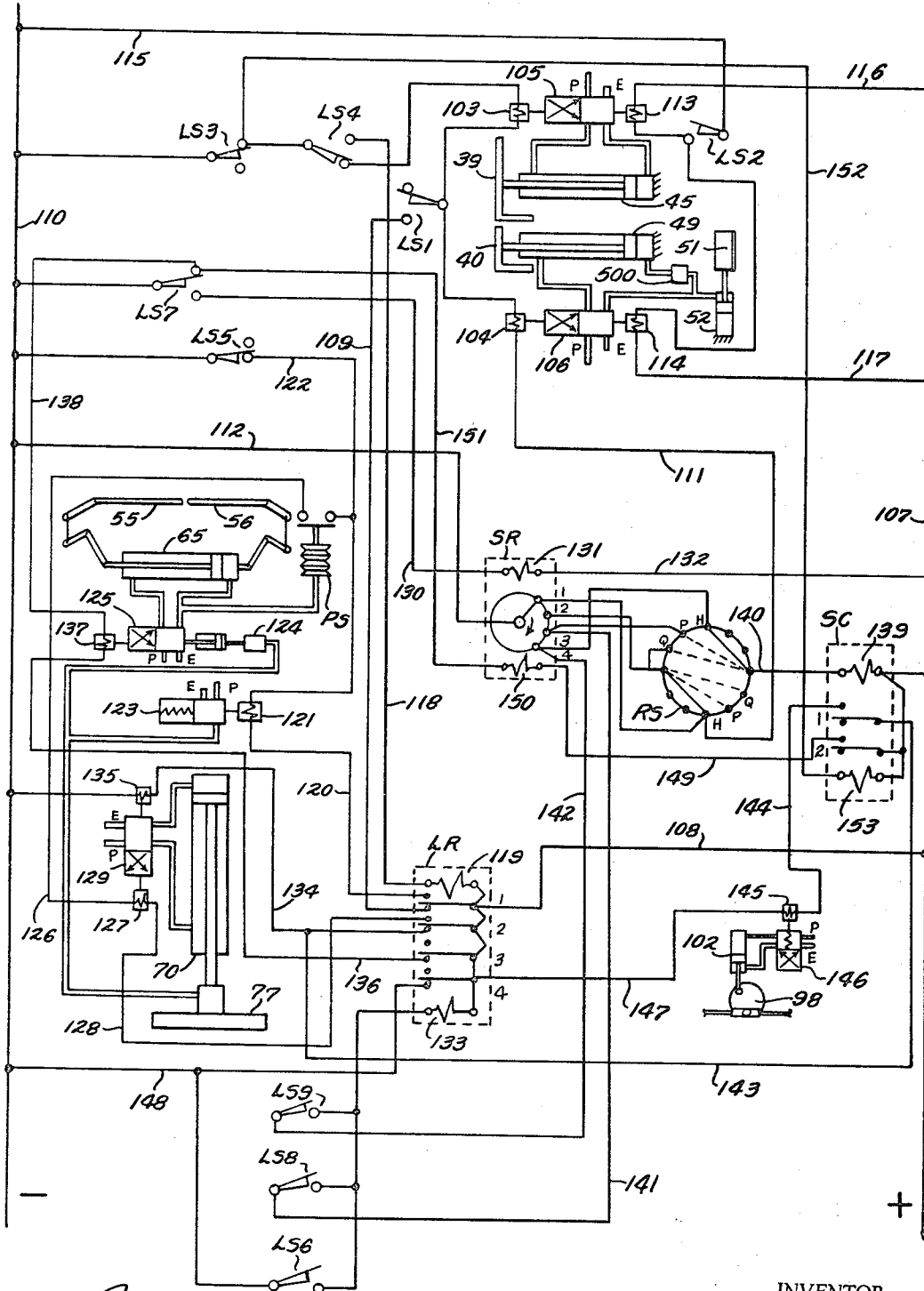


Fig. 11

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1

3,410,047

CASE FILLING MACHINE

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9 Claims. (Cl. 53—61)

This invention relates to improvements in apparatus for handling gabled cartons of various sizes and is particularly directed to machines for automatically assembling and loading said cartons into standard sized cases.

An object of the invention is to provide a simplified, yet positive and reliable control means that will enable a machine having the foregoing characteristics to handle and case various sized, gabled cartons.

Another object of the invention is to provide a novel carton pattern control mechanism that will assemble the required number of cartons for a particular layer to be loaded into an awaiting case.

A further object of the invention is to provide dual pusher bars arranged and coordinated to feed the required number of cartons delivered by a conveyor onto a dead plate and to transfer said cartons to a case loading station.

It is common practice today to market milk and related products in gabled cartons having various content capacities such as gallon, half-gallon, quart, pint and half-pint sizes. All carton sizes are packed in a standard sized case for transport, said case accommodating either four (4) gallon cartons, eight (8) one-half gallon cartons or sixteen (16) quart cartons. The foregoing sized cartons occupy a single layer in the standard case but when this case is used for pint and half-pint sized cartons, the pints are loaded in the case in two layers, the lower layer having sixteen (16) upright cartons and the second layer having twelve (12) inclined cartons. With respect to the one-half pint sized cartons the case is packed with two layers each of sixteen (16) upright cartons and a third layer of twelve (12) inclined cartons. This invention is particularly concerned with a carton casing machine that may readily be adjusted to handle the quart, pint and half-pint cartons but may also, with a few further adjustments be made to automatically handle the gallon and half gallon cartons.

With the foregoing and further objects in view this invention will now be described in conjunction with the accompanying drawings which illustrate a preferred embodiment thereof.

In the drawings wherein like numerals indicate identical parts throughout the several views:

FIG. 1 is a fragmental, side elevational view of my case filling machine.

FIG. 2 is a top plan view of the carton transfer station for my machine, parts being broken away and other parts shown in section.

FIG. 3 is a section taken on line 3—3 of FIG. 2.

FIG. 4 is an enlarged section taken on line 4—4 of FIG. 2.

FIG. 5 is an enlarged section taken on line 5—5 of FIG. 2, showing a detail of the transfer station for my machine.

FIG. 6 is an enlarged section taken on line 6—6 of FIG. 1.

FIG. 7 is a fragmental, end elevational view showing the elevator device serving the loading station of my machine.

FIG. 8 is a section taken on line 8—8 of FIG. 7.

FIG. 9 is a section taken on line 9—9 of FIG. 7.

FIG. 10 is an enlarged, end elevational view showing the case exit gate of my machine, parts being broken away.

2

FIG. 11 is a schematic view showing the electrical and pneumatic control systems for the machine illustrated in FIGS. 1—10 of the drawings.

In general my case filling machine comprises a frame 15 having upright posts 16 connected together by cross members 17 and side members 18 to form a rigid machine structure that straddles a continuously moving case conveyor 19 that is usually located on the floor 20 of a dairy plant, or the like. Gabled cartons 21 to be loaded into a case are fed to a transfer station 22 in a single line, or in parallel multiple lines, by a continuously operating conveyor 23, said transfer station comprising a dead plate 24 which receives and positions a full row or rows of cartons fed to it by the conveyor 23. Dual pushers, generally indicated by the reference numeral 25, are adapted to transfer the required number of positioned cartons from the row on the dead plate, one carton space at a time, into a loading station 26; said loading station being located within an elevator means 27. The elevator means is adapted to grip a layer pattern of cartons assembled at the loading station 26 and lower the pattern into an empty case 28 waiting upon the floor positioned case conveyor 19 at a casing station 29. When the case is filled the case leaves the machine through an exit gate 30 simultaneously with the admittance of the succeeding empty case into the machine through an entrance gate 31 at the inlet side of the machine.

Now with particular reference to FIGS. 1—4 of the drawings the carton transfer station 22 is supported upon a frame consisting of a pair of side members 32—32 supported on legs 33 which in turn are joined at their upper ends by cross bars 34; the downstream sides of the side members 32—32 being connected to the upright posts 16 of the frame 15. The dead plate 24 is positioned upon the cross member 17 of the frame 15 and has its sides resting upon the side members 32—32 in such position that the dead plate is flush with the carton conveyor 23 whereby cartons fed by said conveyor will move laterally across the dead plate and when a full row is present thereupon, a sensing switch LS1 (FIGS. 2 and 3) will be actuated.

Positioned longitudinally of the transfer station upon the cross members 34 are two laterally spaced apart ways 35 and 36 (FIG. 4) each way having a slide 37 and 38, respectively, guided thereon for longitudinal, reciprocating movement. As best shown in FIG. 2 the slide 38 has a relatively wide first pusher plate 39 positioned on its rearward end while the slide 37 has a relatively narrow second pusher plate 40 positioned on its rearward end; both plates having rearwardly extending fences 41 and 42, respectively, extending forwardly from the pusher plates to bar entrance of the cartons from the conveyor 23 while the pushers are operative. The slides and their respective pusher plates are independently operated by means of fluid pressure motors, the slide 38 having a boss 43 depending therefrom through a slot in the way 36 for pivotal engagement with a piston rod 44 of a pneumatic cylinder 45; said cylinder being mounted on the frame cross member 17 by a bracket 46. A boss 47 depends from the slide 37 through a slot in the way 35 and is pivotally connected to a piston rod 48 of a pneumatic cylinder 49, said cylinder being mounted on the cross member 17 by a bracket 50.

As shown in FIGS. 2 and 5 a vertically movable barrier 51 normally projects upwardly through the dead plate 24 in longitudinal alignment with the relatively narrow pusher plate 40, said barrier being in the form of an angle iron that projects through a similarly shaped slot 510 in the dead plate. A pneumatic cylinder 52 is mounted on a frame member 53 and has a rod end connected by a clevis 54 to the bottom of the barrier.

The movements of the barrier are coordinated through a delay action means with the pusher plate 40, as will be more fully brought out in the description of the operation of my machine.

The loading station 26 has a downwardly collapsible platform normally positioned flush with the dead plate 24 and having two wings 55 and 56 hinged along their respective sides to the frame 15. As best shown in FIG. 6 each wing 55 and 56 is bolted to a block 57 and 58, respectively, which are in turn rotatably mounted on the frame posts 16—16 between suitable post mounted bearings 59. An arm 60 and 61 is integral on each block 57 and 58, respectively, the outer end of each arm being link connected to a bell crank 62 and 63, respectively. Each bellcrank is pivotally mounted on the frame by means of a bearing block 64. A pneumatic cylinder 65 floats between the lower ends of the bellcranks, the rod end of the cylinder being pivoted by a clevis 66 to the bellcrank 62 while a cylinder bracket 67 is pivoted to the opposed bellcrank 64. It will therefore be understood that upon introduction of pressure fluid into the rod end of the cylinder 65 the platform wings 55 and 56 will be normally supported in a horizontal position for the reception of a pattern of cartons 21 (FIG. 6) and that upon introduction of pressure fluid into the cylinder end of the cylinder 65 the bellcrank lever connections will quickly swing the wings downwardly into the dot and dashed line positions shown in FIG. 6 to quickly withdraw the platform support from beneath the cartons.

Located vertically above the carton loading station 26 is the elevator 27 comprising a rectangular head 68 (FIGS. 1 and 7) pivotally connected at its central portion to a piston rod 69 depending from a pneumatic cylinder 70. The free end of the rod 69 is threaded to a clevis 71 which in turn is pivoted to the head 68 by a head mounted pin 72. The upper end of the cylinder is pivotally mounted on the frame 15 by a frame mounted bracket 73. With particular references to FIGS. 7 and 8 of the drawings, the head 68 is provided with four corner mounted guides 74 and each guide has an upper and a lower shoe 75 and 76, respectively, which engage the sides of the frame posts 16 that are contiguous to the interior corners thereof (FIG. 8). A polystyrene pad 76 is secured to each shoe and is interposed between the post side and the shoe to provide a wear resistant, non-frictional means between the vertically reciprocated head 68 and the frame posts 16.

A carton gable gripping device 77 depends from the head 68 and is vertically adjustable relative to the head by means of two adjusting screws 78 and 79 rotatably connected at their lower ends to the gripping device and threaded in tapped bores 79 and 80, respectively, formed in the head 68. The screw 79 is rotated by a hand wheel 81; the screw 78 being rotated in unison therewith through a chain and gear arrangement generally indicated by the reference numeral 82. When proper spacing is secured between the elevator head 68 and the gripping device 77 a pair of spacers 83—83 are inserted between and bolted to them to rigidify the adjusted parts.

The gripping device also has a block 84 (FIG. 9) that carries spaced apart, pneumatically operated, spring returned servo cylinders 85, each cylinder having movable jaws on each end which cooperate with like jaws on adjacent servo cylinders. Fixed jaws 86 are provided for cooperation with the outside movable jaws on the end cylinder 85. To clamp the jaws on the carton-gables pressure fluid is introduced simultaneously into the centers of the servo cylinders by a system of inter-connected ducts 87 formed in the block 84, a flexible pressure fluid hose 88 being connected to the system by a suitable fitting 89.

Empty cases are admitted into the machine, one at a time, for movement toward the casing station 29 upon the conveyor 19 by means of the entrance gate 31 which

comprises an arm 90 fixed on the central part of a lateral shaft 91 that is in turn pivotally mounted above the cases on frame mounted bearings 92. An operating lever 93 is fixed on the outer end of the shaft 91, said lever having its free end connected to one end of the link 94; the opposite end of said link being connected to the exit gate 30 which also serves as a case positioning means for the casing station.

The exit gate 30 has a slide member 95, (FIG. 10) normally projecting into the path of the case to be filled, said slide being pivotally connected to a bellcrank lever 96 hinged on the frame and pivotally connected to a link 97 operated by a rotatable disc 98 mounted on the frame member 17. The disc 98 also has a link 99 that is connected to a bellcrank 100 pivotally mounted on the frame, the free end of said lever being connected to the link 94. A link 101 connects the rod end of a pneumatic cylinder 102 to the disc 98, the cylinder side of the cylinder 102 being pivotally connected to the frame member 17 by a bracket 103. Upon actuation of the cylinder 102 in one direction the entrance gate arm 90 will engage and stop the incoming cases and the slide member 91 will position an empty case in case loading position, simultaneously. When the cylinder 102 is actuated in the opposite direction the case positioning slide 95 will be withdrawn simultaneously with the upper pivotal movement of the arm 90 permitting the filled case to leave the machine and the following empty case to move toward case loading position. When a case is in case loading position a sensing switch LS5 will be closed, as will be more fully appreciated hereafter.

OPERATION

The operation of the machine shown in FIGS. 1—10 of the drawings will now be described in conjunction with the electric and pneumatic control circuits depicted diagrammatically in FIG. 11. The electric limit switches denoted in FIG. 11 as LS1 through LS9 have been located on the machine shown in the several views of the drawing, it being noted here that the elevator actuated switches LS6 through LS9 are mounted on a single post 16 in vertical, spaced apart positions beneath, and in the same manner as, switch LS3 shown in FIG. 8 of the drawings. Also all electric and pneumatic controls that are subject to remote locations are enclosed in a control box B mounted on a side of the machine frame 15.

With particular reference to FIGURE 11 of the drawings, all the control means are shown in normal positions for filling a case with one-half pint cartons and permitting operation of the carton transfer device, an empty case 28 being in position for filling at the loading station. In this normal position the elevator 27 is in its upper inoperative condition closing upper limit switch LS3, an empty case 28 is in loading position closing case sensing switch LS5 and the transfer station 22 is in condition to receive a row of gabled cartons from the conveyor 23.

When a full row of carton delivered by the conveyor 23 is upon the dead plate 24 a full carton row sensing switch LS1 is closed which then simultaneously energizes solenoids 103 and 104 to operate fluid pressure valves 105 and 106, respectively, and introduce pressure fluid into the pusher cylinders 45 and 49, respectively, to advance the row of cartons one carton space onto the platform wings 55 and 56. The two circuits completed by the closed position of the switch LS1 are as follows: a common circuit consisting of a positive power line 107, a wire 108, contact #1 on a bank relay switch LR, a wire 109 to the switch LS1; a branch circuit comprising solenoid 103, switches LS4 and LS3 and a ground power line 110, and a branch circuit comprising solenoid 104, a wire 111, through a manually set switch RS, the rotatable arm on a stepping relay SR, a wire 112 and the ground power line 110.

As the pushers reach their one carton space limit of movement an arm 112 (FIGS. 2—4) on the slide pusher 38 closes the switch LS2 which, as shown in FIG. 11, actu-

ates solenoids 113 and 114 and reversing valves 105 and 106, respectively, which introduces pressure fluid to the opposite sides of the cylinders 45 and 49, respectively, to return the pushers to normal positions for a succeeding carton pushing operation. The circuit for the foregoing pusher return actuation is the ground line 110, a wire 115, the switch LS2 and wires 116 and 117 which respectively connect the solenoids 113 and 114 to the positive power line 107. The foregoing operations are repeated until a full pattern layer of cartons is assembled upon the platform wings 55 and 56 at which time the carton pattern sensing switch LS4 (FIG. 1) will be actuated and moved from the lower contact position shown in FIG. 11 to the upper contact position thereby energizing a wire 118 which actuates a solenoid 119 on the bank relay switch LR because of its connection with the wire 108 and the power line 107. All the contacts on bank relay switch LR are therefore moved to positions opposite to the positions shown in FIG. 11 whereby a circuit is established from the power line 107 through the wire 108 to contact #1 on bank relay switch LR, a wire 120, a solenoid 121 and a wire 122 provided an empty case is in its filling station when switch LS5 will be closed to connect said circuit to the power line 110. Actuation of the solenoid 121 introduces fluid pressure through valve 123 to the gable top carton gripper 77 and also through a choke valve 124 to a valve 125 which somewhat delays actuation of the floating platform operating cylinder 65 to swing the wings 55 and 56 downwardly just after the gripper operates. A pressure switch PS is also actuated after full collapse of the platform link to close a circuit from wire 122 through a wire 126, a solenoid 127, a wire 128 through contact #2 on bank relay switch LR to the power line 107 through the wire 108. When the solenoid 127 is actuated a valve 129 operates to introduce fluid pressure into the cylinder 70 and lower the elevator with its pattern of cartons into the awaiting case.

As the elevator is lowered the switch LS3 is opened and a switch LS7 is momentarily moved to its lower position, as it is shown in FIG. 11, said switch position connecting power line 110 through wire 130 to a solenoid 131 on the stepping switch SR and a wire 132 to the power line 107 which advances the stepping switch arm one step clockwise to engage contact #2 on said switch.

As the elevator descends with its pattern of cartons it passes inactive switches LS9 and LS8 and then closes a switch LS6 which introduces power from the line 110 to a solenoid 133 on the bank relay switch LR, through the common line of said switch and through the wire 108 to the power line 107, thus returning all the contacts on bank relay switch LR to the full line positions shown in FIG. 11. In so doing the power from the wire 108 is introduced through contact #2 to a line 134, a solenoid 135 and the power line 110 whereby the valve 129 will be actuated to introduce pressure fluid into the lower end of the cylinder 70 and return the elevator to its upper inoperative position. Also, contact #3 on the bank relay switch LR connects the wire 108 with a wire 136 to actuate a solenoid 137 through a wire 138, the switch LS7 and the power line 110 to actuate the valve 125 and return the platform wings 55 and 56 to their operative carton supporting positions.

To coordinate the return movements of the elevator 27 and the platform wings 55 and 56 it will be noted that as the bank relay switch LR is returned to its full line position the contact #1 opens the electric circuit to the solenoid 121 allowing the spring to return the valve 123 to a position shutting off pressure fluid to the gripper 77 which opens the gable engaging jaws and causes deposit of the carton layer pattern into the awaiting empty case. Also even though the solenoid 137 has been actuated to introduce pressure fluid into the valve 125 by contact #3 on bank relay switch LR connecting said solenoid to the line 108, such valve actuation must work against the pressure in the opposite pneumatic valve actuator to

force trapped air through the pressure valve PS, and this delays return movements of the platform wings to operative positions until the elevator 27 has reached its upper retracted position.

As the elevator 27 reaches its upper retracted position the switch LS3 is again closed to initiate operation of the machine for the assembly and deposit of the second layer of half-pint cartons into the awaiting case, it being noted that now the arm on the stepping relay SR is on contact #2 whereby pusher 39 will be actuated as before and pusher 40 will be actuated by the following circuit; the wire 108, the contact #1 on bank relay switch LR, the wire 109, the switch LS1, the solenoid 104, the wire 111, through manually set switch RS to contact #2 on the stepping relay SR and the power wire 112. It is observed that when the arm on stepping switch SR is on contact #2 the power wire 112 is connected to a solenoid 139 on a stroke counter SC through the stepping switch RS by a wire 140 to count the first carton pattern delivery stroke of the elevator. Thus full rows of half-pint cartons will be again assembled on the platform wings and when a full complement of cartons is present on said wings the switch LS4 will be operated to actuate the solenoid 119 and operate the bank relay switch LR which in turn operates the gripper 77 and initiates downward movement of the elevator, as has been described heretofore. As the elevator descends switch LS7 will be again actuated which will move the arm on the stepping relay SR to contact #3 thereby placing the circuit for an elevator switch LS8 in an operative condition, said arm connecting the power wire 112 with a wire 141 leading to the switch LS8 and also connecting the power wire 112 with the elevator stroke counter SC through manually set switch RS and the wire 140.

As the elevator closes switch LS8, the solenoid 133 will be actuated to return the contacts on bank relay switch LR to the full line positions thus again releasing the carton gable gripper 77 and returning both the elevator and the platform wings to normal positions. It will also be noted that when the arm of stepping switch engages contact #3 the arm will not make a power connection through the wire 112 for the solenoid 104 and therefore during the succeeding carton loading operation for the assembly of the third and final layer to be inserted in the awaiting case the cylinder 49 will not be actuated and the short pusher 40 will therefore remain inoperative. The large pusher 39 will then intermittently push partial rows of cartons, one carton row at a time, onto the platform wings and as the layer pattern of partial rows is completed on the platform the switch LS4 will be closed which will initiate the grippers and the elevator to lower the partial layer toward the awaiting case. In order to positively feed only a partial pattern of cartons onto the platforms by pusher 39 and allow the partial pattern to move past the carton in front of the pusher 40 the barrier 51 prevents movement of said carton until the cylinder 49 is operative, the cylinder 52 for the barrier being connected to the pressure line for operating the pusher 40 in front of a choke valve 500 that permits quick retraction of the barrier before the cylinder 49 operates the pusher.

As the elevator descends with said partial layer pattern the switch LS7 will again be closed to operate the stepping switch SR and move the arm into engagement with contact #4, said arm position placing a switch LS9 in operative condition by connecting the power wire 112 with a wire 142 leading to said switch LS9. This #4 contact also energizes the solenoid 139 on the stroke counter SC through manually set switch RS and the wire 140 to move its contact arms #1 and #2 to positions opposed to those shown in full lines in the drawing (FIG. 11). When the elevator closes the switch LS9 the gripper is de-energized and deposits the partial pattern of cartons in the case and the elevator is again retracted toward its upper limit of motion. Closing of the switch LS9 also completes the following circuits put in readiness by the

stroke counter SC namely: the power line 107, the wire 108, contact #2 on the bank relay switch LR, a wire 143, contact #1 on stroke counter SC, a wire 144, a solenoid 145 for spring returned gate valve 146, a wire 147, contact #4 on the bank relay switch LR, a wire 148, and the power line 110. Thus entrance and exit gates 31 and 30, respectively, are opened by the pneumatic cylinder 102 permitting the conveyor 19 to move the filled case out of the machine and to move an empty case toward the machine loading position. Also, the operative position of the stroke counter SC will connect the power line 107 through contact #2 on the stroke counter SC and a wire 149, to a solenoid 150 to reset the arm of the stepping switch SR to its #1 position, the solenoid circuit being completed through a wire 151, the switch LS7 to the power line 110. As the elevator reaches its upper inoperative position switch LS3 will be closed thus making a counter resetting circuit namely: the power line 110, the switch LS3, a wire 152, a solenoid 153 and through the stroke counter SC to the power line 107. Resetting of the counter will move its two contacts to the full line positions shown in the drawing thus opening the circuits to the reset solenoid 150 on the stepping relay SR and to the solenoid 145 which permits the valve 146 to be spring returned to its gate closing position thus positioning an empty case in filling position within the machine and barring entrance of the following empty case thereinto.

Whenever it becomes desirous to pack pint cartons into empty cases 28 the machine may be readily adjusted to that operation by removing the braces 83—83 (FIG. 7) from between the elevator head 68 and the gripper 86, operating the screw adjustments 78—79 by turning hand wheel 81 to secure the proper gripper height and then bolting shorter braces 83—83 in place. The only other adjustment to be made is the turning of the operating knob (not shown) of manually set switch RS to the proper setting and then starting the machine. The foregoing procedure is followed when converting the machine to handle quart sized cartons, it being understood that when pint cartons are being cased two successive layers of cartons will be packed into the case and but one full layer of cartons, will be packed in each case for the quart sized cartons. By changing the gripper head, the spacing between the gripper and the elevator head the widths of the dead plate and carton conveyor and setting the manually set switch RS for packing quarts, i.e. one layer of a full carton pattern, my machine may be converted to pack four (4) gallon or eight (8) half-gallon cartons into the awaiting case.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a machine for loading cartons into a rectangular case in layers, a loading platform, a dead plate disposed at one end of the loading platform, a conveyor delivering a lateral row of cartons onto the dead plate, a pair of pusher plates each adapted to move a part of the cartons in the row one carton space at a time from the dead plate onto the platform, a power means connected to each pusher plate, a vertically reciprocated carton gripper and elevator means located above the loading platform and adapted to engage a pattern layer of cartons assembled on the loading platform, means locating a case beneath the platform, carton layer sensing means adjacent the platform actuating the carton gripper and elevator means to engage and move the carton layer pattern from the loading station into the case, and control means conditioned by movement of the elevator for independently actuating one of the power means.

2. A machine according to claim 1 wherein the power means are fluid actuated cylinders served by conduit means connected to a supply of fluid under pressure, and the control means comprises an elevator actuated stepping relay, and solenoid operated valves actuated by the

stepping relay for introducing pressure fluid from the conduit means to each of the cylinders.

3. A machine according to claim 1 wherein the elevator means is operative during dwell periods of the pusher members.

4. A machine according to claim 1 wherein the control means is a multi-positioned switch adapted in one position to operate both power means in unison and in another position adapted to operate one of said power means.

5. In a machine for loading several layers of cartons into a case comprising a platform adapted to accumulate a case layer of cartons thereon, an elevator mounted for vertical movement above the platform, means locating the case vertically beneath said platform, a collapsible support for the platform, a dead plate having an end positioned at one end of, and flush with the platform, a conveyor delivering a lateral row of cartons upon the dead plate, a pair of pusher plates at the opposite end of the dead plate and each plate adapted to advance a part of the row, one carton space, onto the platform, a pair of independently operated power means for reciprocating each plate to assemble a case layer of cartons on the platform, a row sensing switch beside the dead plate normally actuating the power means in unison, a case layer sensing switch at the opposite end of the platform adapted to collapse the platform and operate the elevator to engage and lower a case layer of cartons into the case, and an elevator operated control means connected to one of the power means and adapted to render the row sensing switch inoperative with respect to said power means.

6. A machine according to claim 5 wherein the elevator operated control means is an electric switch disposed in the path of the elevator, said switch being adapted to actuate a stepping relay connected to one of the power means.

7. In a machine for loading cartons into a case in layer pattern of different quantities, the combination of a dead plate, means periodically presenting a constant number of cartons in a row on the dead plate, a carton loading station adapted to receive a case layer of cartons, an elevator adapted to engage and deposit the case layer into a case, a first and a second pusher member mounted for independent, reciprocating movement at one end of the dead plate and each pusher member being adapted to engage a part of the total number of cartons in the row and normally advance them periodically and in unison, one carton space at a time, into the loading station until a case layer is assembled, and control means operated by the elevator selectively rendering the second pusher member inoperative to advance its cartons into the loading station.

8. A machine according to claim 7 wherein the row comprises a constant number of four cartons and the first pusher member engages three cartons in the row and the second pusher member engages one carton in the row.

9. In a machine for loading cartons into a case in layers, a carton pattern assembly station, a carton conveyor, a pair of pusher plates each adapted to move a part of a row of cartons from the conveyor to the pattern assembly station, an independent power means connected to each pusher plate, means locating a case beneath the station, a vertically reciprocated carton gripping device adapted to periodically deposit the pattern of cartons assembled at the station into the case, carton layer sensing means at the station actuating the carton gripping device to engage and move the carton pattern from the station into the case, and control means adapted to independently actuate each of the power means.

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TRAVIS S. MCGEHEE, *Primary Examiner*.