

Dec. 9, 1958

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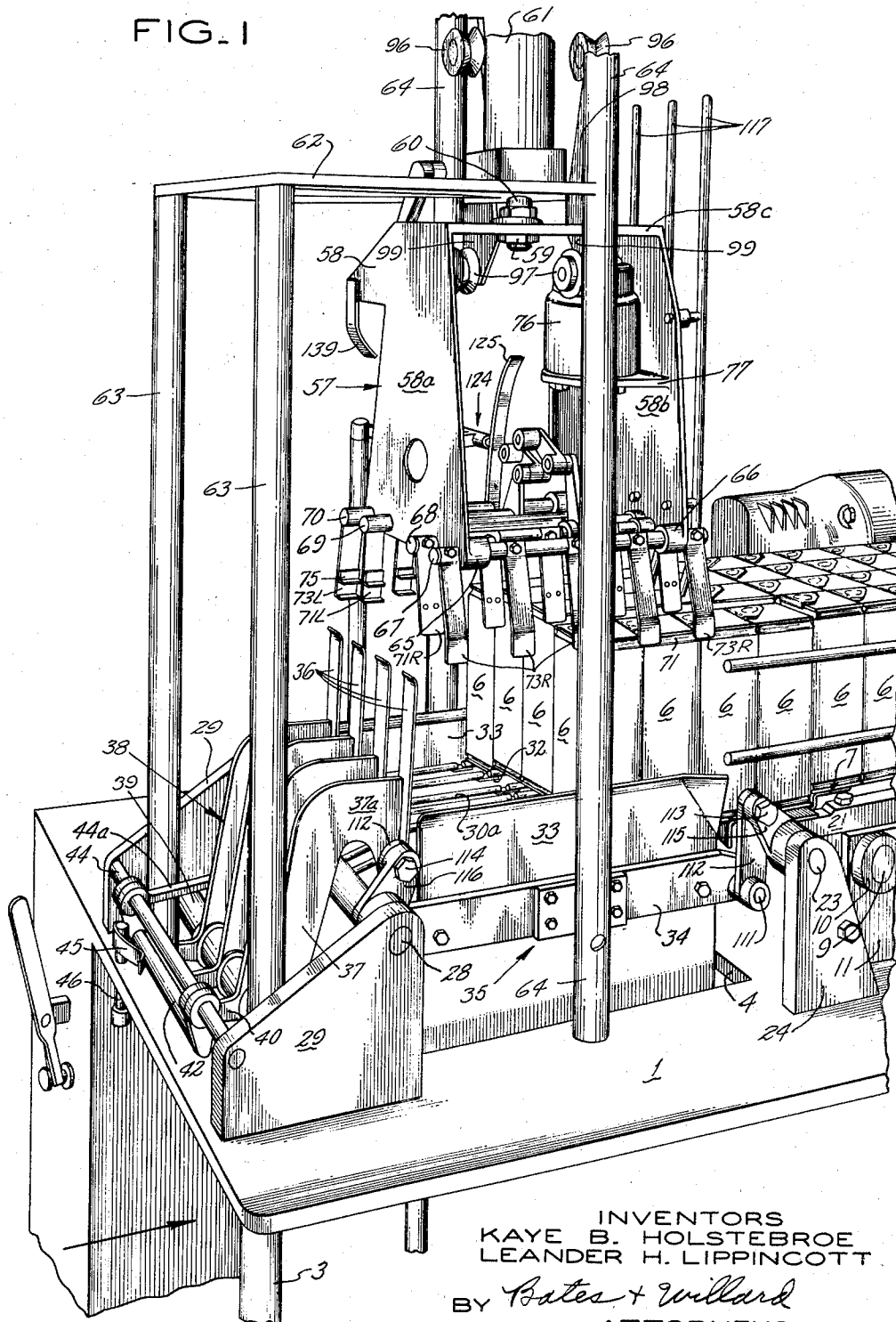
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MACHINES FOR PACKING CONTAINERS IN CASES

Filed Aug. 15, 1955

6 Sheets-Sheet 1

FIG. 1



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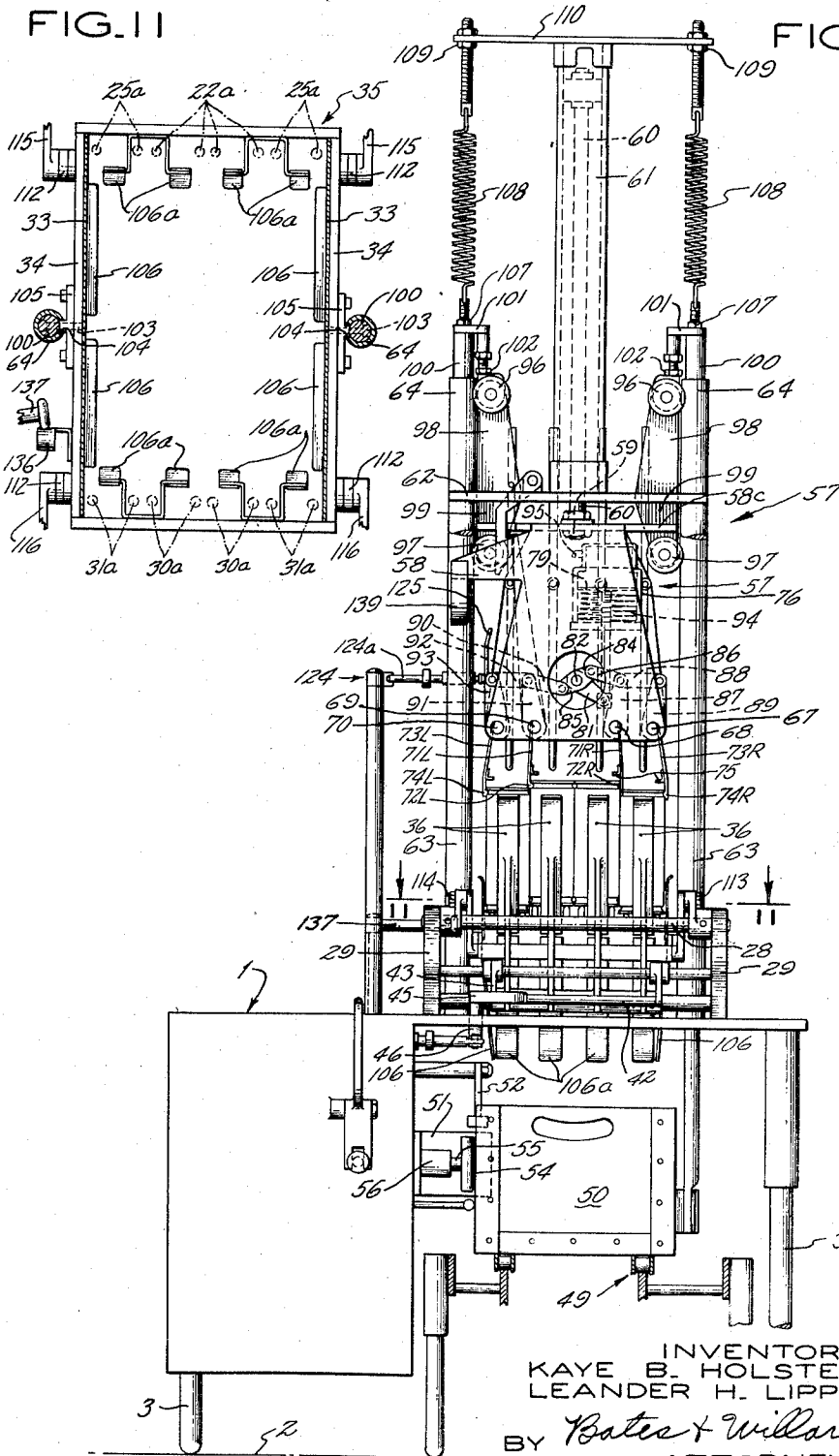
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FIG. 11

FIG. 2



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FIG. 3

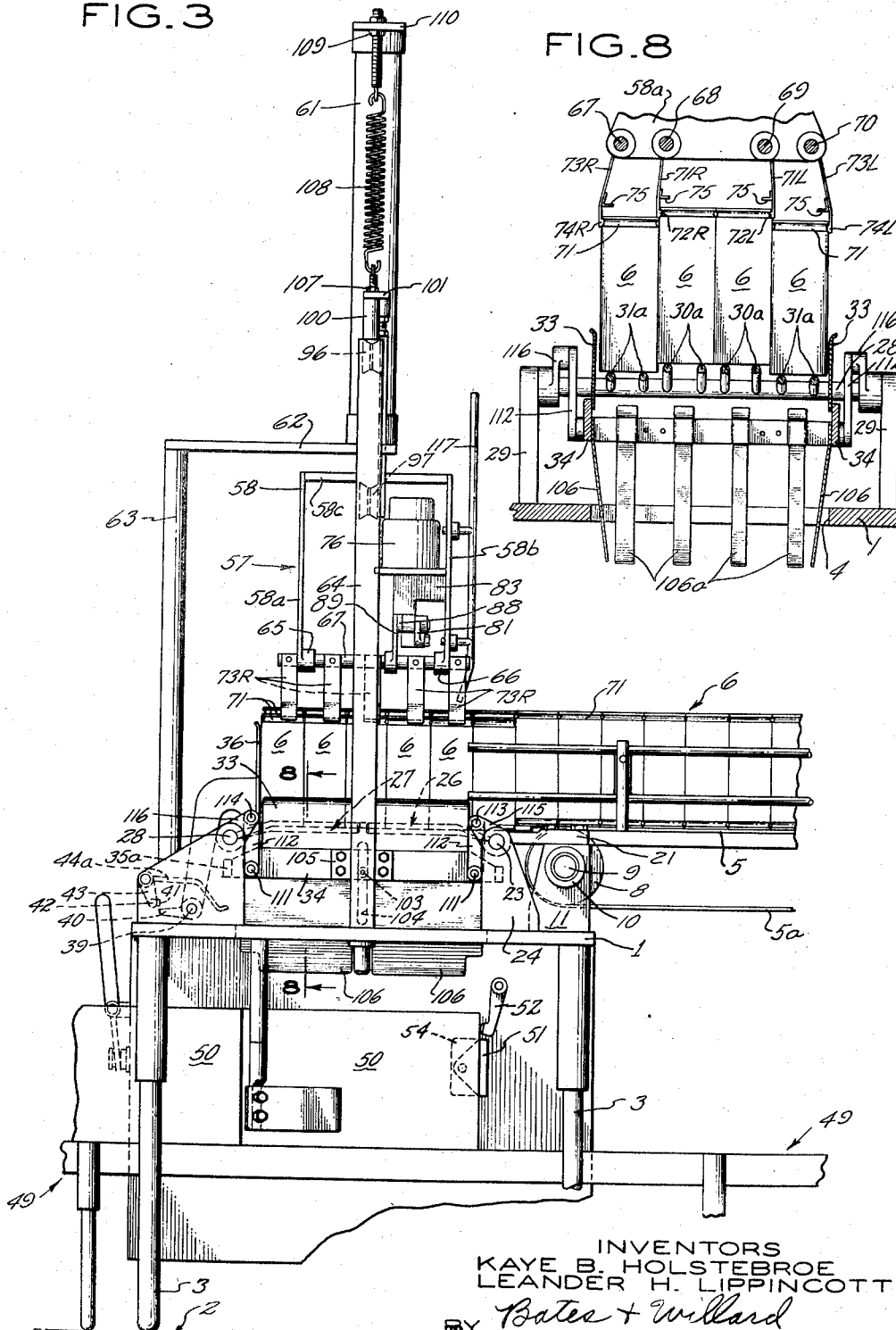
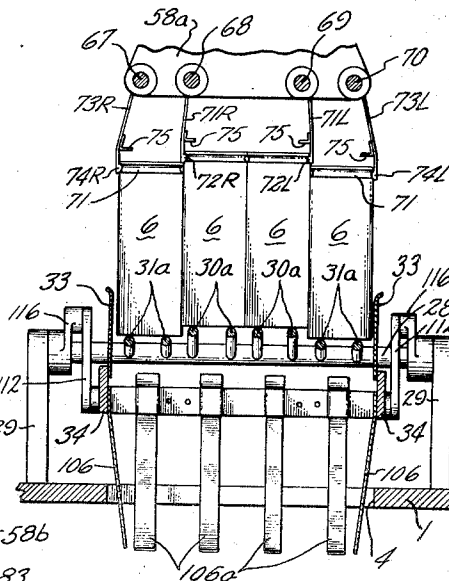


FIG. 8



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FIG. 4

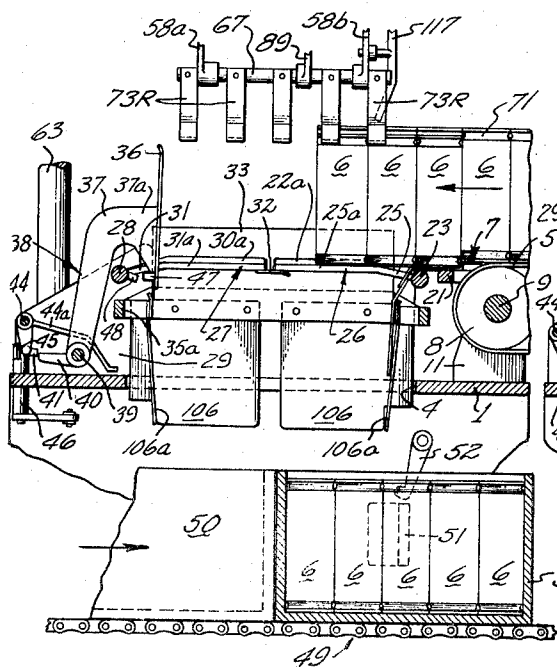


FIG. 5

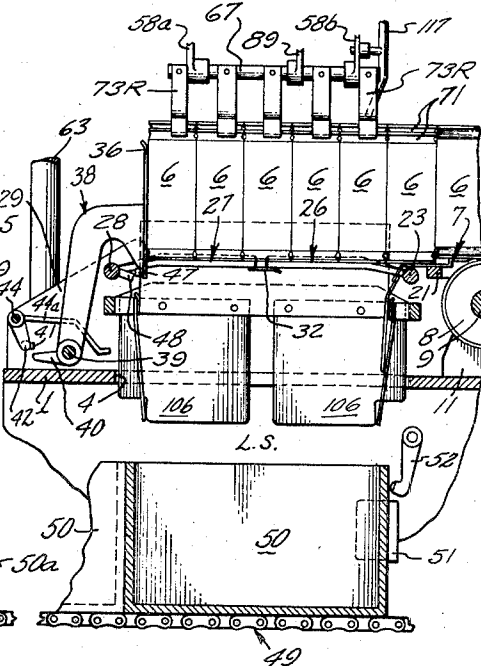


FIG. 6

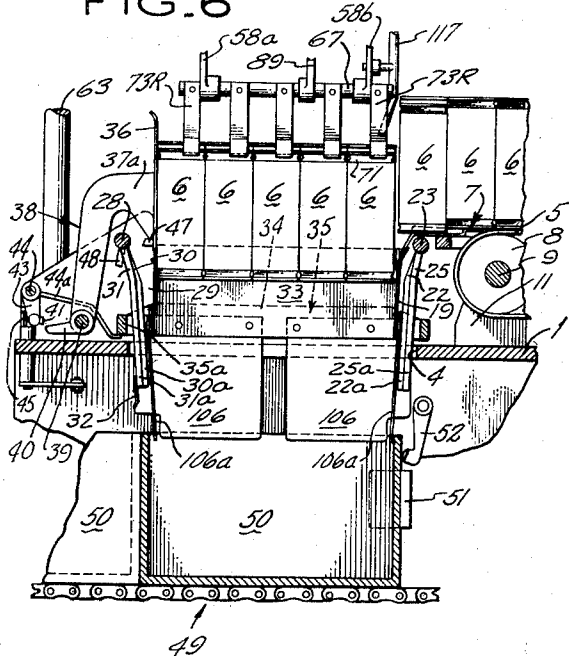
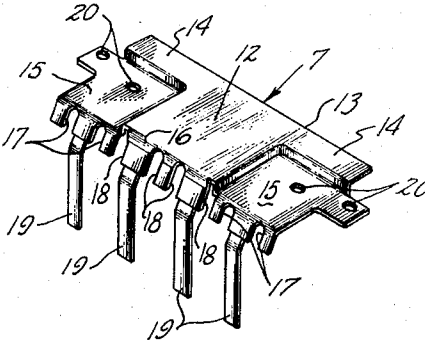


FIG. 7



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FIG.9

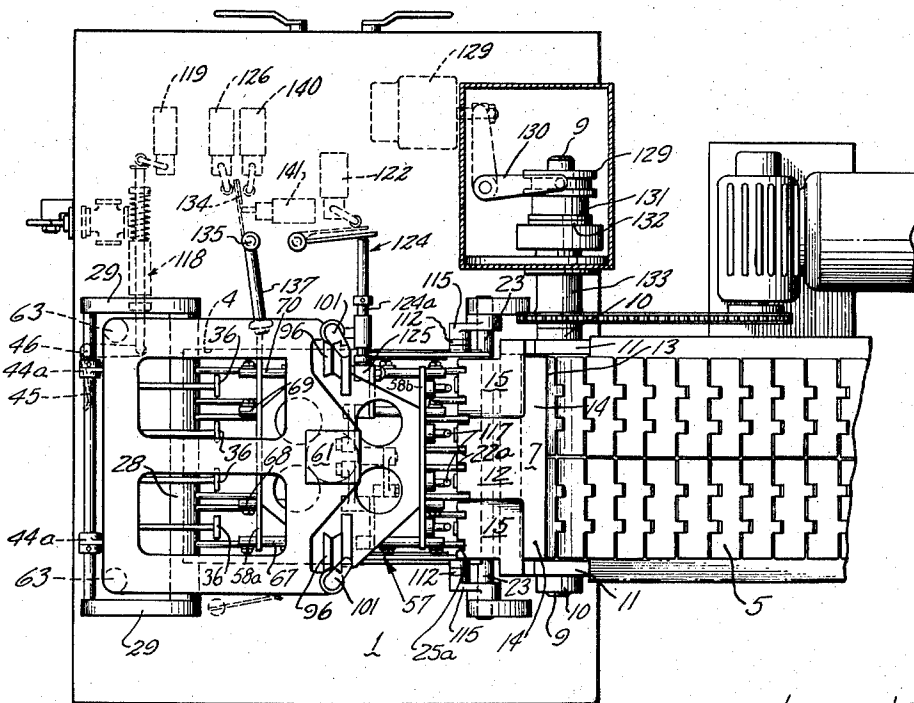
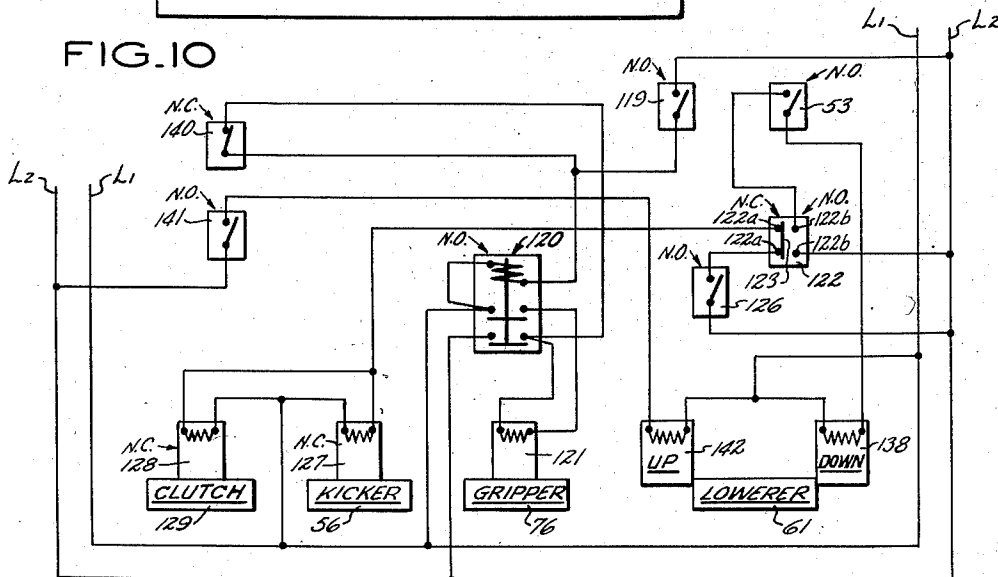


FIG. 10



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FIG. 13

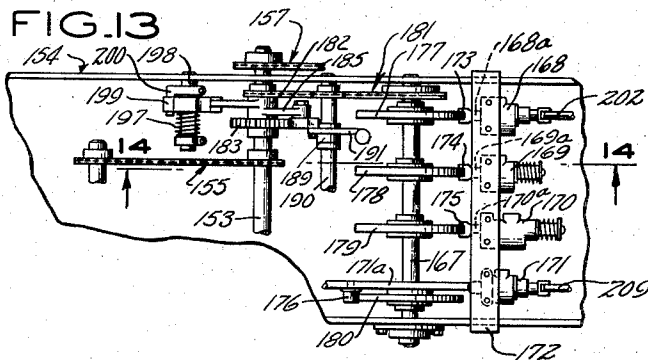


FIG. 15

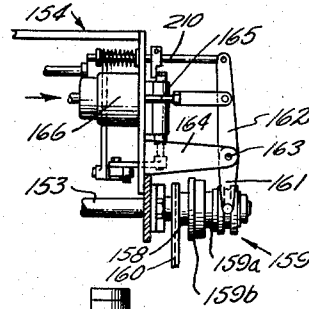


FIG. 12

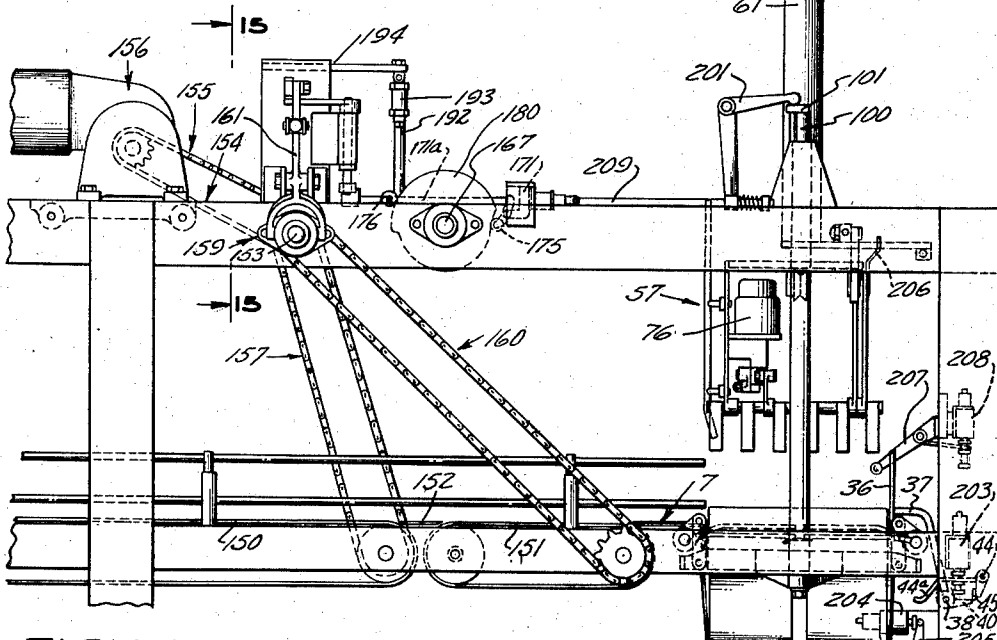
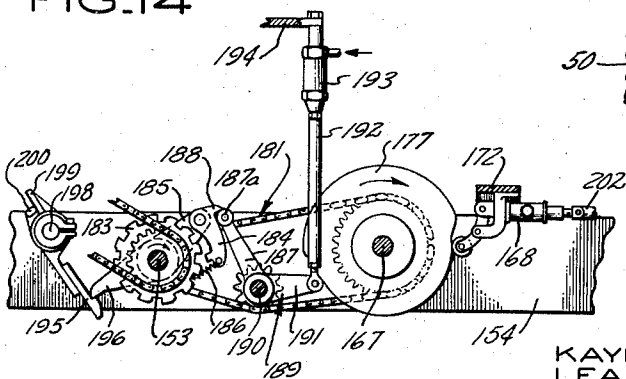


FIG. 14



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MACHINES FOR PACKING CONTAINERS IN CASES

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Application August 15, 1955, Serial No. 528,465

12 Claims. (Cl. 53—62)

This invention relates to improvements in machines for packing containers in cases for shipment, storage or other purpose and more particularly to improvements in packing machines of the type that is operable to form the containers to be packed in successive case charges or load-groups at one level and to lower each such charge or load-group into a waiting case positioned at a lower level.

While not limited thereto, the improved packing machine of the present invention is particularly adapted to form and pack into cases charges or load-groups of flat-topped containers which are square or rectangular in cross-sectional configuration and are substantially uniform in cross-section from their bottoms to their tops.

An example of containers of the kind referred to is the flat top, fiber, milk carton. These are made in different sizes and different numbers of the individual containers, packed closely together, may be required to fill the cases in which they are to be packed. Thus, quart-size such containers may be packed in a case in four parallel rows, each row containing 4, 5 or 6 containers or a total of 16, 20 or 24 containers. In this arrangement, adjacent containers are in close order formation, being in side-to-side contact both in the same row and in adjacent rows. Larger size milk containers, as the half-gallon size, may be packed in their case in four parallel rows but with fewer containers in each row, as 3 or a multiple thereof.

An object of the invention is to provide automatic machinery operable to assemble containers of the kind described into successive case-charges or load-groups and to pack such charges or load-groups into their cases at a high rate, as in the order of 240 quart-size such containers per minute.

A further, more specific object of the invention is to provide means for temporarily undersupporting the containers of each of successive charges or load-groups as formed so that such charge or load-group can be gripped by novel gripping means of a vertically movable lowering mechanism and lowered as an entity into a waiting case by a downward stroke of that mechanism.

Other objects and advantages of the invention hereinafter will be pointed out or will be apparent from the following description of a practical embodiment of the invention as shown in the accompanying drawings, in which:

Fig. 1 is a fragmentary perspective view of the novel packing machine, showing its charge-lowering mechanism in a raised position above a charge-forming area in which containers for a charge are being advanced in four rows by the line pressure of oncoming containers on an infeed or supply conveyor;

Fig. 2 is a relatively reduced front view of the packing machine;

Fig. 3 is a side elevation of such machine;

Fig. 4 is a fragmentary longitudinal, vertical sectional view of a portion of the machine, with elements shown in elevation, the view showing the relationship of the ele-

ments of this portion of the machine at an early stage in the assembly of a complete charge, at which time an empty case is moving toward and a loaded preceding case is being moved away from the case loading station;

Fig. 5 is a view similar to Fig. 4 at a later stage in a cycle of operations, the view showing the empty case in position at the loading station and a complete charge assembled just before start of its downward movement;

Fig. 6 is a view like each of Figs. 4 and 5 but at a still later stage in a cycle of operations, the charge of containers being in the course of being lowered through a lowered funnel into the waiting case;

Fig. 7 is a perspective view of a novel dead plate over which containers are forced by line pressure from the supply or infeed conveyor into the charge forming part of the machine;

Fig. 8 is a relatively enlarged section substantially along the line of 8—8 of Fig. 3, showing the manner in which the inner longitudinal rows of containers of a charge are temporarily undersupported so as to be positioned at a higher level than the containers of the outer longitudinal rows of the charge;

Fig. 9 is a plan view of the packing machine;

Fig. 10 is a diagram of electrical control and wiring means for operating parts of the machine as shown in the preceding views;

Fig. 11 is a horizontal section along the line 11—11 of Fig. 2, showing the charge funnel and certain associate elements;

Fig. 12 is a partial side elevation showing driving and timing elements of a mechanical control system of a modified form of the machine, the view also showing the charge lowering mechanism and a portion of the packing case conveyor;

Fig. 13 is a partial top view of the driving and timing elements of the control mechanism shown in Fig. 12;

Fig. 14 is a vertical cross-sectional view on the line 14—14 of Fig. 13; and

Fig. 15 is a partial cross-sectional view taken on the line 15—15 of Fig. 12, showing a conveyor clutch mechanism that is included in this form of the machine.

The framework structure of our packing machine may comprise a table or platform 1, Figs. 1 to 6, inclusive, and 9, supported at a desirable height above a factory floor 2, Fig. 3, by legs 3, Figs. 1, 2 and 3, or in any other suitable known manner.

Table 1 may be substantially rectangular in plan, Fig. 9, and be provided with an opening 4 of suitable size and shape to permit a charge or load-group of the containers to be packed to be lowered therethrough as will hereinafter be explained. Opening 4 may be rectangular as shown in Fig. 9.

A horizontal infeed or supply conveyor 5, Figs. 3 to 6, inclusive, and 9, is provided to bring containers 6 to be packed to a dead plate 7. See also Figs. 1 and 7, the latter of which shows the dead plate detached and alone. Conveyor 5 is the upper stretch of a flexible belt 5a which is trained about a driving roll 8 on a transverse conveyor head shaft 9 which is mounted in bearings 10 on transversely spaced brackets 11 which are upstanding on the platform 1 adjacent to the rearward edge of the latter and rearwardly of the rear edge of the platform opening 4. See Fig. 9. The conveyor belt may be additionally supported by any suitable known means (not shown). The arrangement is such that its upper stretch, constituting the conveyor 5, will be driven to advance containers thereon toward the dead plate 7 when the shaft 9 is rotated counterclockwise as viewed in Figs. 3 to 6, inclusive. The means for intermittently thus rotating the shaft 9 and its operation will hereinafter be described.

The dead plate 7, Fig. 7, is formed to provide a flat-

surfaced relatively wide middle portion 12 extending from the rear edge 13 of the plate for substantially its entire fore-and-aft extent and a pair of oppositely extending co-planar lateral portions 14 which extend from the rear edge 13 for only part of the fore-and-aft extent of the plate. The plate has relatively depressed, co-planar flat-surfaced portions 15—15 located in advance of the lateral portions 14—14 and at opposite sides of the middle portion 12. The front edge portion 16 of the plate may be bent downwardly and forwardly as shown and provided at regularly spaced intervals with rounded notches in its edge, there being two of these notches indicated at 17—17 at the front of each of the lower level plate portions 15—15 and four of such notches, each indicated at 18, at the front of the higher level middle portion 12. Four uniformly spaced apart forwardly and downwardly extending guide fingers 19 are provided on the front edge portion of the plate, there being one of such fingers at the front of each of the lower level plate portions 15—15 and two at the front of the higher level middle portion 12. Such guide fingers may be integral with these portions of the plate or separately formed strips secured by welding or other known means (not shown) to the plate.

Plate 7 is provided with holes 20 for the reception of screws (not shown) or other suitable fastening elements by which the plate may be mounted on a support, as on the cross bar which is shown partly at 21 in Figs. 4 to 6, inclusive, in a desired position with respect to the conveyor 5. As shown best in Fig. 9, plate 7 is in close proximity to the conveyor 5 at the container discharge end of the latter and, as is shown by Figs. 4 to 6, inclusive, the higher level portions of the plate are at the same level as that of such conveyor. The front edge portion of the plate is approximately above the rear edge of opening 4 in the platform 1 and the fingers 19 extend downwardly nearly to the plane of that opening.

The containers 6 are brought in four parallel longitudinally extending rows by conveyor 5 to the dead plate 7 onto which they are pushed by line pressure from oncoming containers. The leading containers of the two outside longitudinal rows drop or step down slightly as they are propelled on the dead plate from the higher level wing portions 14—14 onto the lower depressed portions 15—15 of the dead plate while the containers of the inside longitudinal rows are maintained at the relatively higher level by the middle portion 12 of the dead plate.

From the dead plate, the leading containers of the two inside longitudinal rows are advanced at the same relatively higher level onto horizontal portions 22a of forwardly projecting supporting fingers 22 fixed to a transversely disposed rock shaft 23 which is mounted in bearings in upstanding brackets, such as that shown at 24, Fig. 3, on platform 1 so as to extend across the underside of the front edge portion 16 of the dead plate 7. The fingers 22 are four in number in the example shown and respectively extend through the notches 18 in the front edge portion of the dead plate. Other supporting fingers 25 project forwardly from the rock shaft 23 through the notches 17 in the front edge portion of the dead plate and have relatively lower level forwardly projecting horizontal portions 25a onto which containers are advanced from and at the level of the lower level portions 15—15 of the dead plate. There are four of the fingers 25 in the example shown, two projecting in advance of each of the portions 15 of the dead plate.

The assemblage of transverse rock shaft 23 and forwardly projecting fingers 22 and 25 constitutes the rear pivoted section, generally designated 26, of a two-part disappearing type trap door for temporarily under-supporting containers of the four rows passing over the dead plate as such containers are accumulated to form a case charge or load-group which during its formation will be supported directly above the opening 4 in the platform 1.

This trap door has a front section, generally designated 27, comprising a transverse rock shaft 28 supported in bearings in upstanding transversely spaced brackets 29 located on platform 1 in advance of platform opening 4, rearwardly extending fingers 30 fixed to the rock shaft and having horizontal portions 30a at the same level as and in line with the portions 22a of the rear door section fingers, and other fingers 31 also fixed to the rock shaft and having horizontal portions 31a at the same lower level as and in line with horizontal portions 25a of the rear door section fingers 26. When these door section fingers are in their raised, charge supporting positions as shown in Figs. 1, 3, 4 and 5, the free, adjacent ends of aligned fingers of the two door sections may be kept exactly aligned for smooth travel of containers thereover, as by providing a fixed lug 32, Figs. 1, 4 and 5, on the underside of one of each two aligned fingers in position to project beyond the end thereof in under-supporting contact with the end portion of the aligned finger.

Containers 6 pushed onto the raised sections of the charge supporting trap door may be restrained against deviation from straight forward paths of movement by sideboards 33. These may be plates made of sheet metal or other suitable material fixed at their lower portions to the inner sides of parallel side members 34 of a horizontally disposed rectangular funnel rim frame 35 which is mounted by means presently to be described for limited vertical movements above and in centered relation with the opening 4 in platform 1. The containers of a charge consisting of four rows may thus be kept in close order formation as the charge is formed on the raised sections of the supporting trap door in the example shown.

Just before the leading containers of the several longitudinal rows of the charge arrive at their fully advanced positions on the supporting trap door, they will strike forwardly movable full row detectors 36 which then are in their normal positions in the paths of containers as shown in Figs. 1 and 4. There is one such detector for each longitudinal row of the charge. See Fig. 1. Each detector thus struck will be pushed slightly forward to the position shown in Figs. 3, 5 and 6. When all detectors have been thus moved, a cycle of operations for the loading of the charge into a case will be initiated as hereinafter will be explained.

In the example shown, each detector 36 is a substantially vertical flat strip formed integrally with or otherwise fixed to the rearwardly turned end portion 37a of an upwardly and rearwardly inclined arm 37 of a lever 38 which is loose on a transverse shaft 39 that is mounted at its ends in portions of the transversely spaced bracket arms 29 on the platform 1. Each lever 38 has a short forwardly projecting arm 40 extending at an approximate right angle with the lever arm 37 so as to be in line with and engage frictionally with the end of a rearwardly extending short stop arm 41 on a transversely extending rod 42 which is carried by a pair of transversely spaced downwardly extending rocker arms 43 on a transversely extending rock shaft 44 which is mounted at its ends in portions of the bracket arms 29. See Figs. 1, 2 and 4. A rigid finger 45, Figs. 1 and 2, fixed to and projecting laterally from a vertical rock shaft 46 that is mounted in the platform 1 continuously exerts rearward pressure against the front side of transverse rod 42. This pressure will be ineffective to move the rod 42 rearwardly about the axis of rock shaft 44 from the position shown in Figs. 1 and 4 as long as the short forwardly extending arm 40 of any of the row detector levers 38 is in endwise engagement with its cooperative stop arm 41 as best seen in Fig. 4. When, however, the detectors for all the rows of a charge of the containers 6 have been actuated by the leading containers of such rows and the detector levers 38 have been swung counterclockwise as viewed in Figs. 4 to 6, inclusive, the short latching arms 40 of such levers will be swung downwardly from the position shown for one of these arms in Fig. 4 to the dis-

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engaged position of the same arm in each of Figs. 5 and 6. Such counterclockwise swinging movement of a detector lever will be stopped by the contact of a forwardly projecting striker element 47 on the end portion 37a of lever arm 37 with the end of a short fixed rearwardly projecting rocker element 48 on the rock shaft 28 by which the supporting fingers of the front trap door 27 are carried. Compare the relative positions of elements 47 and 48 in Figs. 4 and 5, respectively. A slight further counterclockwise swinging movement of the detector levers 38 to relieve any residual line pressures on the containers of the several longitudinal rows of a segregated charge may take place when the rock shaft 28 has been rotated clockwise by means hereinafter to be described to lower the fingers of the front trap door section 27 from their raised positions as shown in Fig. 5 to lowered positions as shown in Fig. 6 as this will also swing the elements 48 out of latching engagement with their cooperative elements 47, as from the position shown in Fig. 5 for one of the elements 48 to the position of the same element as shown in Fig. 6.

A case conveying system 49, fragmentary portions of which are shown in Figs. 2 to 6, inclusive, is provided to bring successive leading cases of a continuous line of empty cases 50 from a supply source along a horizontal path to a case loading station L. S. which is located directly beneath the opening 4 in platform 1 as best seen in Fig. 5. On arriving at this station, each of successive leading empty cases of the line and the oncoming cases back of it will be temporarily halted by a fixed stop 51 which projects from one side of the path of movement of the line of cases into such path to a sufficient extent to be struck by the leading vertical wall of the leading case over an area located near the adjacent front corner portion of that case. Just before arriving at the loading station, each leading case 50 will strike a pivoted case detector 52 which will be actuated by the final movement of such case to the loading station to act through suitable motion transmitting connections, not shown, to close a normally open case detector switch 53, Fig. 10, of the electrical control mechanism of the form of machine of Figs. 1 to 11, inclusive. When a case at the loading station has been loaded with a charge of the containers 6 as hereinafter will be explained, a case kicker element 54 on the extremity of a piston rod 55 of an air motor 56, Fig. 2, will be projected forcibly against the adjacent side of the loaded case so as to impel it laterally on the conveyor system clear of the fixed stop 51 and pivoted case detector 52 so that the loaded case will be advanced beyond the loading station, as in the case of the loaded case indicated at 50a in Fig. 4. The oncoming line of empty cases will be moved forward at the same time and the next empty case in line back of the loaded case will be advanced toward the loading station.

The case conveying means, the switch operating case detector and the loaded case kicker means as just described are substantially the same as those which are shown and described in our co-pending application, Serial No. 466,558, filed November 3, 1954, for Machines for Packing Articles in Cases, now Patent No. 2,815,623.

The means for depositing a charge of the containers 6 in a waiting case at the loading station comprises a vertically movable charge gripper head generally indicated at 57, Figs. 1, 2 and 3. Gripper head 57 comprises a frame 58 which generally is of inverted U-shape and consists of a pair of spaced parallel front and rear vertical plate members 58a and 58b respectively, connected together at their upper ends by a flat, head plate member 58c, all as best seen in Fig. 1. Head plate member 58c is secured by a floating connecting means 59 to the lower end of a piston rod 60 which extends downwardly from the lower end of a vertically disposed air cylinder 61 which is mounted on an elevated stationary, horizontal supporting plate 62. Plate 62 is supported at the desired height and in the desired position above the open-

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ing 4 in the platform 1 by a pair of transversely spaced posts 63 and a pair of more rearwardly located transversely spaced posts 64, all uprising from the platform 1 and to which the plate 62 is attached by welding or in any other suitable known manner.

The gripper head frame front and rear vertical plates have aligned bearings, such as those indicated at 65 and 66, respectively, Figs. 1 and 3, in their lower portions and longitudinally extending gripper finger rock shafts 67, 68, 69, and 70, Figs. 1 and 2, are journaled in these aligned bearings and may be sufficiently long to project from their bearings at the front and rear of these plates as shown for the rock shaft 67 in Figs. 1 and 3. The containers 6 have grooves 71 extending around their vertical walls near the tops of such containers. The two inner gripper rock shafts, 68 and 69, respectively, are located equidistant from a longitudinal, vertical plane containing the longitudinal center line of the gripper head frame. See Figs. 2 and 8. These rock shafts carry downwardly extending gripper means operable to engage the grooved outer sides of the upper end portions of the relatively higher containers 6 of the two inner longitudinal rows of a charge to clamp the containers of each such row firmly against the containers of the other row. The two outer gripper rock shafts, 67 and 70, respectively, are located equidistant from the adjacent inner gripper rock shafts and carry downwardly extending gripper means operable in unison with each other and with the gripper members on the inner gripper rock shafts to engage the grooved outer sides of the upper end portions of the containers of the two outer longitudinal rows of the charge to clamp the containers of the outer rows firmly against the containers of the inner rows. In the gripper mechanism shown, the gripper means carried by the right hand inner rock shaft, 68, as viewed in Figs. 2 and 8, comprises five flat gripper fingers 71R fixed at their upper ends to such rock shaft as shown in Fig. 1 and each provided at the inner side of its lower free extremity with a projecting bead or rib 72R adapted to enter the groove in the outer side of the upper end portion of the corresponding container of the right hand inner row of the charge. The left hand inner gripper rock shaft, 69, has similar gripper fingers 71L each provided with a similar bead or rib 72L at the inner side of its free end. The right hand outer gripper rock shaft, 67, has slightly longer gripper fingers 73R each provided with a bead or rib 74R on the inner side of its lower, free extremity. The left hand outer gripper shaft, 70, has similar gripper fingers 73L, each provided with a groove entering bead or rib 74L. The gripper fingers may be provided on their inner sides with projections 75 fixed thereto only a slight distance above their container engaging beads or ribs. If the containers engaged by such fingers, or some of such containers, should be frictionally engaged by a wall of the charge funnel or other relatively stationary surface while the charge is being lowered by the grippers as presently will be described, the projections 75 will be struck by any containers tending to stick while the grippers continue to move downward and will overcome such sticking.

It is obvious that the number of gripper fingers carried by a gripper rock shaft may be selected according to the number of containers in a longitudinal row of a charge to be engaged by such fingers and that, if desired, the gripping means carried by a rock shaft may be provided as a single gripper member for engaging all the containers of a row.

An operating mechanism is provided to turn the gripper rock shafts simultaneously about their respective axes so that one inner and one outer rock shaft are turned in a direction the reverse of that of the other inner and other outer rock shaft. The operating mechanism shown comprises a vertically disposed air motor 76, Figs. 1, 2 and 3, preferably of a spring loaded diaphragm type, mounted on a shelf 77 on the inner side of vertical gripper head

frame member 58b. A rod 78 depending from a diaphragm 79 in the cylinder is operatively connected at its lower end at 80, Fig. 2, to a rocker arm 81 on a short actuating rock shaft 82 which is operatively mounted in a bracket 83 on frame member 58b. Rock shaft 82 carries a pair of oppositely extending other rocker arms indicated at 84 and 85, respectively, Fig. 2. Arm 84 is operatively connected by a link 86 to the upper end of an upstanding rocker arm 87 on rock shaft 68. Rocker arm 87 is operatively connected by a link 88 with the upper end of a rocker arm 89 which is upstanding on rock shaft 67. At the opposite side of actuating rock shaft 82, arm 85 is operatively connected by a link 90 with the upper end of an upwardly extending rocker arm 91 on rock shaft 69 and rocker arm 91 is operatively connected by a link 92 with the upper end of an upwardly extending rocker arm 93 on rock shaft 70. A spring 94 in the cylinder 76 tends to retain the diaphragm 79 therein at the upper end of its stroke so as to keep the gripper means in their outwardly swung, disengaged positions. Cylinder 76 has an air connection, indicated at 95, so that air under pressure may be admitted thereto at a suitable time in the cycle of the machine as hereinafter explained, to effect a downward stroke of the diaphragm 79 against the action of the spring 94 to cause the gripper means to swing to their container engaging positions.

The gripper head mechanism 57 is guided in its vertical movements and is prevented from turning angularly about the axis of the suspending piston rod 60 by the rolling contact of upper grooved wheels 96 and lower grooved wheels 97 with the inner sides of the transversely aligned vertical supports 64, these grooved wheels being mounted on the gripper head frame to move therewith and so that there is one upper grooved wheel and one lower grooved wheel in rolling contact with each of the relatively stationary vertical supports 64. See Figs. 1, 2 and 3. As best seen in Fig. 2, each upper wheel 96 is carried by an upwardly extending rigid arm 98 which may be formed as an integral part of the gripper frame head member 58c or formed separately and rigidly secured thereto by welding or any other suitable fastening means, none being shown. The lower wheels 97 are carried by arms 99 which extend downwardly from and are rigid with the gripper frame head member 58c.

Uprights 64 are tubular and each serves as a guide for vertically movable rod 100 which extends there-through. Each rod 100 has a laterally extending rigid arm 101 fixed to its upper end. Each arm 101 overhangs a stop element on the gripper frame head member and carries a depending adjustable length rigid contact element 102 adapted to rest on that stop element when the gripper head is in its raised position as shown in Figs. 2 and 3. As shown in these views, the upwardly extending supporting arms for the grooved wheels 96 serve also as the stop elements on which the contact elements 102 rest. The rods 100 are in their raised positions in these views.

Rods 100 are connected to the charge funnel rim frame 35 so that vertical movements thereof are attended by like vertical movements of the funnel. The connection of each rod is with a side member 34 of the funnel rim frame, as by a rigid fastening element 103, Figs. 3 and 11, fixed to a portion of the rod so as to project from the inner side thereof through a vertical slot 104 in the inner side of the upright 64 containing the rod, and through a spacing plate 105 attached to the funnel rim side member, 34, such fastening element being secured to such adjacent member 34. The funnel rim frame carries depending charge guiding funnel side wall members 106 which are free at and may be slightly convergent toward their lower ends as shown in Figs. 4 to 6, inclusive, and also spaced depending front and rear funnel strips 106a, Fig. 11. Lowering of the rods 100 as hereinafter explained will be attended by lowering of the funnel from its raised position as shown in Figs. 1, 3, 4 and 5 to a lowered position at which the lower ends of the funnel

wall members will extend downwardly into the upper part of the waiting empty case at the loading station as shown in Fig. 6.

The upper ends of the rods 100 are connected, as at 107, Fig. 2, to the lower ends of vertically disposed coil springs 108, the upper ends of which are connected adjustably, as at 109, to the opposite ends of a supporting cross bar 110 which may be mounted on the upper end of the gripper head cylinder 61 as shown or secured in a relatively fixed, elevated position in any suitable known manner. The springs 108 preferably are practically free from tension when the rods 100 are raised as shown in Fig. 2 and will yield sufficiently under the weight of the connected rods and charge funnel to permit these elements to move downward as a unit by gravity when the gripper head descends until the arms 101 rest upon the upper ends of the tubular posts 64 and the funnel depends into the waiting case. By that time sufficient tension may have been set up in the springs to dampen the final downward strokes of these parts so that they will be brought to a stop without harmful shocks or jars.

An assembly of vertically movable charge funnel and connected vertical slide rods operable in response to vertical movements of the gripper mechanism also is disclosed in our aforesaid application, Serial No. 466,558, filed November 3, 1954.

Each of the side members 34 of the charge funnel rim frame is provided adjacent to its opposite ends with a pair of outwardly projecting pivot elements 111 as shown for one of these side members in Fig. 3. Links 112 are pivotally mounted at their lower ends on these pivot elements and are pivotally attached at their upper ends at 113 and 114, respectively, to rocker arms 115 and 116, respectively, on the rear trap door section rock shaft 23 and the front trap door section rock shaft 28, respectively. Downward movement of the funnel as permitted by a downward movement of the charge gripping mechanism will therefore cause the sections of the trap door to swing downwardly from their raised charge supporting positions as shown in Figs. 1 to 5, inclusive, to their open out-of-the-way positions at the front and rear, respectively, of the lowered funnel through which the charge may be lowered into the waiting case at the loading station as shown in Fig. 6. The trap door section fingers swing downwardly in the funnel through gaps between adjacent depending front and rear funnel strips 106a to out-of-the-way positions within the front and rear portions of the funnel frame 35 as shown in Fig. 11. The return, upward movement of the funnel will be attended by return, upward swinging movements of the trap door sections.

The gripper head frame carries a gate which may consist of a plurality of transversely aligned vertical rods 117 fixed to the rear gripper head frame member 58b, Figs. 1 to 6, inclusive, and 9. Descent of the gripper head to lower a charge of containers through the lowered funnel into a waiting case will be attended by a lowering of this gate from a raised position above the path of movement of containers from the dead plate 7 onto the raised trap door sections to a lowered position such as to block movement of containers forwardly from the dead plate. The gate will be raised when the gripper head is raised.

As hereinbefore pointed out, actuation of the row detectors 36 by filling of the longitudinal rows of a charge or load-group of containers, will effect unblocking of the suspended cross bar 42 so that it may be swung rearwardly from the position shown in Figs. 1 and 4 to the position shown in Fig. 5 by the rigid finger 45, Fig. 1. The vertical shaft 46, Figs. 1 and 9, to which leaf spring 45 is fixed, will be rocked counterclockwise so as to actuate a switch operating mechanism 118, Fig. 9, so as to close a normally open switch 119, Figs. 9 and 10. Closing of switch 119 will effect closing of a normally open holding relay 120 and actuation of a solenoid valve

121, Fig. 10, which is operatively connected with the spring-loaded diaphragm type air motor 76, Figs. 1 to 3, inclusive, and 10. As shown in Fig. 10, switch 119 and the coil of relay 120 will be connected electrically in series between electric mains L2 and L1 when switch 119 is closed and the coil of solenoid valve 121 will be electrically connected with these mains through the closed holding relay 120. The air motor 76 will now act to swing the gripper fingers to their container engaging positions so that the containers of the charge will be clamped together between co-acting respectively right-hand and left-hand gripper fingers and thus will be suspended from the gripper head when the charge is without under-support, as when the trap door sections 26 and 27 are swung downwardly.

A double throw switch 122, Figs. 9 and 10, has a switch bar 123 normally in contact with a set of contacts 122a but throwable out of contact with these into contact with a second set of contacts 122b as is clear from Fig. 10. A mechanism for effecting this throw-over of the switch bar is indicated at 124 in Figs. 2 and 9 and includes a push rod 124a operable by a rockable actuator 125 operable by the rock shaft 70, Fig. 2, of the lever-and-linkage system for the gripper fingers. The arrangement is such that the push rod 124a is moved to effect throwing of the switch bar 123 from the contacts 122a to the contacts 122b of switch 122 when the gripper fingers are closed to grip the cartons of the charge.

Referring again to Fig. 10, it will be noted that one of the contacts 122a of switch 122 is connected to one side of a normally open switch 126, the other side of which is connected to main L2. The second contact 122a is connected to one end of the coil of each of solenoid valves 127 and 128 respectively. The opposite ends of the coils of these valves are connected to main L1. Solenoid valve 127 is operatively associated with case kicker air motor 56 which preferably is of a spring-loaded diaphragm type. Solenoid valve 128 is operatively associated with a clutch air motor 129 which preferably also is of a spring-loaded diaphragm type. Air motor 129 is shown in Fig. 9 as operatively connected to a shifter fork 130 for shifting a driven clutch part 131 along shaft 9 relative to a continuously rotating driving clutch part 132 on a motor-driven sleeve 133 which is loose on the shaft. The arrangement is such that the clutch will be engaged and shaft 9 will be rotated to drive the conveyor 5 to the left, as viewed in Fig. 9, when the air motor 129 is being operated by the solenoid valve 128.

The final part of the upward or return stroke of the charge lowering mechanism is utilized to effect closing of normally open switch 126. As shown in Fig. 9, switch 126 is arranged to be closed by a horizontally swingable switch actuating rocker arm 134 which projects from a vertical rock shaft 135 when the rock shaft is rocked counterclockwise about its axis to the extent required. To accomplish this, a cam strip 136, see Fig. 11, is mounted to move with the gripper head during the final part of its upward stroke and the initial part of its downward stroke so as to engage the free end portion of a rocker arm 137 projecting from the rock shaft 135 as shown in Figs. 2 and 9 and to bias such arm counterclockwise as viewed in Fig. 9 to close the switch 126 as the gripper head completes its upward movement and to maintain it closed on the initial part of the succeeding downward stroke of such head. In the example shown, the cam strip 136 is on a side member 34 of the funnel frame, Fig. 11, which, as hereinbefore has been explained, is raised during the final part of the upward stroke and lowered during the initial part of the downward stroke of the gripper head.

With the switch 126 closed and the switch bar 123 against the contacts 122a of switch 122, as when the gripper head is up, the circuit for energizing the coils of solenoid valves 127 and 128 will be complete. The case kicker head will be projected and the clutch controlling

the operation of the conveyor 5 will be engaged. When, however, filling of the rows of a charge has resulted in closing of switch 119, closing of the grippers, and an operation of switch 122 to throw the bar 123 of such switch from the contacts 122a to the contacts 122b, such circuit will be broken. The clutch will be disengaged, the operation of conveyor 5 will be interrupted, the case kicker head will be retracted and the switch 53 will be closed by the action of an empty case as it moves to a filling position at the loading station as hereinbefore has been explained. Switch 53 is in series with the contacts 122b of switch 122 so that a circuit will be completed to energize the coil of a solenoid valve 138, Fig. 10. Solenoid valve 138 is operatively associated with the gripper head cylinder 61 so that a downward stroke of such gripper head will thus be initiated. The trap door sections will be swung downwardly out of the way of the descending charge, the funnel will be lowered to extend into the waiting case, and the suspended charge will be lowered through the funnel into the underlying case.

A cam strip 139, Figs. 1, 2, is fixed to the gripper head frame in position to engage the rocker arm 137, Fig. 9, when the gripper head is near the end of its charge lowering stroke and to bias such rocker arm clockwise as viewed in Fig. 9 so as to actuate switch actuator 134 first to open a normally closed switch 140 and almost immediately thereafter close a normally open switch 141. See also Fig. 10. As shown in the latter view, opening of switch 140 will deenergize the holding relay 120 so that the grippers will be opened, thereby releasing the containers of the charge to the enclosing case. Closing of switch 141 will complete a circuit through the coil of a solenoid valve 142 which is operatively associated with the gripper head air motor 61 so as to reverse the direction of movement of the gripper head and start it on its upward journey. Switch 126 will again be closed in the manner and by means hereinbefore described during the final part of the upstroke of the gripper head and, the switch 122 then being in its normal position with the bar 123 against the contacts 122a, the coils of the solenoid valves 127 and 128 for the case kicker and clutch operating air motors will be energized to effect ejection of the filled case from the loading station and resumption of the container infeed movement of conveyor 5. Accumulation of containers on the raised trap door sections to form the next charge will thus be commenced.

When the charge funnel descends from the position shown in Figs. 4 and 5 to that shown in Fig. 6, the front end member 35a, of the funnel rim frame 35, will strike the free outer end of a temporarily raised rearwardly extending reset rocker arm 44a on rock shaft 44 and will push that arm downward, thereby acting through such rock shaft and the depending rocker arms 43 to return the spring pressed cross member 42 to its foremost latched-out position. Finger 45 will thereby be moved forwardly, turning the vertical rock shaft 46 clockwise, whereupon switch 119, Figs. 9 and 10, will be reset in its normal open position.

The electrical controls for the air operated packing machine as hereinbefore particularly described may be dispensed with and a mechanical control system provided instead, as in the modified form of machine shown by Figs. 12 to 15, inclusive.

In this form of the machine, the container infeed conveying means comprises a first horizontal conveyor 150 and a second relatively short horizontal conveyor 151 in line therewith as shown in Fig. 12 together with a driving mechanism for driving the first conveyor continuously and the second conveyor intermittently. A dead plate 152 between conveyors 150 and 151 will support the containers as they are advanced from the first conveyor to the second. The second conveyor will deliver containers onto the dead plate 7 from which they will be forced by line pressure onto the supporting fingers of the closed trap door sections beneath the raised gripper head mech-

anism 57 as in the form of machine which already has been described herein.

The infeed conveyor driving mechanism comprises a drive shaft 153 supported operatively in a transversely disposed relatively elevated position with respect to the conveyors by a suitable supporting frame structure generally indicated at 154, Fig. 12. Shaft 153 has a driven connection 155 with a motor 156 which may be mounted on the same frame structure. Shaft 153 has a driving connection 157 with conveyor 150 so that the latter will be driven continuously in the direction to advance the containers thereon toward conveyor 151 when the motor is operating. A sleeve 158, Fig. 15, which is loose on drive shaft 153 but connectable therewith by a clutch mechanism 159, Figs. 12 and 15, has a driving connection indicated generally at 160, Fig. 12, with conveyor 151 so as to drive the latter at the same speed and in the same direction as the first conveyor 150 when the sleeve 158 is clutched to the rotating drive shaft.

Conveyor clutch 159 is of conventional construction and mode of operation and comprises a clutch part 159a rotating with the shaft 153 and shiftable therealong by a shifter fork 161 into and out of engagement with a cooperative clutch part 159b on sleeve 158. Shifter fork 161 is carried by one end of a lever 162 which is intermediately pivoted at 163 on a bracket arm 164 on a part of the frame structure 154, the opposite end of the lever being operatively connected with the projecting rod 165 of a conveyor clutch air motor 166 which corresponds to the conveyor clutch motor 129 of the previously described form of machine.

A cam shaft 167 is operatively supported by the frame structure 154 in parallel relation to the drive shaft 153 and adjacent thereto. A row of transversely aligned valves indicated at 168, 169, 170 and 171, respectively, Fig. 13, is supported in parallel relation to the cam shaft at the opposite side of the latter from the drive shaft, as by a supporting cross frame member 172. These valves have axially movable stems 168a, 169a, 170a, and 171a, respectively, provided with connected cam followers 173, 174, 175 and 176, respectively, arranged in operative association with cams 177, 178, 179 and 180, respectively, which are mounted on the cam shaft 167 to rotate therewith. A driving connection indicated generally at 181, Figs. 13 and 14, is provided between a sleeve 182, Fig. 13, which is loose on the drive shaft 153, and the cam shaft 167 to rotate the latter clockwise as viewed in Fig. 14 through 180° each time the sleeve is operatively connected with the drive shaft so as to be rotated by the latter for a full revolution about the axis of the drive shaft. This connection may be effected by a normally disengaged single revolution clutch. This, in the example shown, comprises a ratchet wheel 183 mounted on the drive shaft 153 adjacent to one end of sleeve 182 to rotate with the drive shaft, a pivoted pawl 184 mounted on a projecting rigid arm 185 on the sleeve 182 and continuously urged by a spring 186, Fig. 14, to position to engage with the first encountered tooth in the periphery of the ratchet wheel but normally latched out of such engagement by a pivoted pawl latch-out arm 187 having a contact element 187a at its free end normally disposed in the path of a projecting lug 188 on the back of the pawl 184. Arm 187 may be an arm of a bell crank lever 189 mounted on a supporting shaft 190, such lever also including another arm, 191, at the side of the shaft 190 opposite the pawl and operatively connected to a downwardly extending axially movable rod 192 projecting from an air motor 193 which is supported in a fixed position, as by supporting means 194, Fig. 12, on the framework structure 154. When air motor 193 is operated by air pressure, as presently explained, bell crank lever 189 will be operated to swing the arm 187 thereof out of engagement with the lug 188 on the pawl to permit engagement of the latter with the ratchet wheel and consequent rotation of the sleeve 182 through a full revolution before further

rotation thereof is stopped by the latch-out arm 187 which in the meantime has been returned to its pawl engaging and latching-out position. Rotation of the sleeve 182 in the opposite direction, i. e., clockwise as viewed in Fig. 14, is prevented by the engagement of a yielding, spring loaded, pivoted pawl 195 with the extremity of a rigid arm 196 which projects from the pawl carrying arm 185. A torsion spring 197, Fig. 13, urges the pivoted pawl 195 clockwise about the axis of its pivotal support 198, Fig. 14, until a rigid projection 199 on the hub of the pawl bears against a fixed stop 200, at which time pawl 195 will be in position to engage with the extremity of sleeve arm 196 so as to stop any reverse rotary motion of the sleeve.

Other valves and valve operating mechanisms are included in the mechanically controlled air driven machine and will be pointed out in the following description of a cycle of operations of this form of the device.

Prior to starting the machine, the dead plate 7 is preloaded with containers as in the case of the electrically controlled type of machine. Valve 170, Fig. 13, is normally open and operatively connected by conventional means (not shown) with the lower part of the gripper mechanism air cylinder 61 so that the gripper head 57 will be raised to its "up" position when the machine operating air has been turned on. The funnel connected rods 100, one of which is shown in Fig. 12, will be raised during the final part of the upstroke of the gripper head and each of these will actuate a spring-loaded pivoted bell crank lever, one of which is shown at 201 in Fig. 12. One of these bell crank levers will act through suitable motion transmitting means, shown in part at 202, Figs. 13 and 14, to open the conveyor clutch air motor valve 163 so that return of the gripper head to its raised position will be accompanied by a throwing in of the clutch 159. Starting of the motor 156 will then cause both conveyors 150 and 151 to be driven to advance containers over the dead plate 7 onto the raised two-section charge supporting trap door.

When the longitudinal rows of a charge have all been filled, the charge row detectors 36 will all have been actuated so as to effect unlatching of the previously latched-out rearwardly swingable cross member 42, Fig. 12, under the influence of its load-imposing finger 45. This will cause raising of the rocker arm 44a on rock shaft 44. The rocker arm 44a will strike and open a normally closed air valve 203. Valve 203 is in series with an air valve 204, which is opened by a suitably-acting actuator 205 when an empty case is brought by the conveyor system 49 to the loading station, Fig. 12, and with the air motor 193 for activating the single revolution cam shaft clutch. Thus, when both air valves 203 and 204 have been opened, air motor 193 will be operated and cam shaft 167 will be rotated through 180°. This rotary movement of the cam shaft and of the cams thereon will effect opening of normally closed spring loaded valve 169 which is operatively connected by means, not shown, with the gripper cylinder 76, so that the grippers will be closed to grip the containers of the charge; also, actuation of valve 168 to effect de-clutching of the conveyor clutch 159 to stop the intermittently driven conveyor 151 and actuation of the valve 170 which controls gripper head cylinder 61 so as to lower the gripper head and the charge of containers suspended therefrom.

At the end of the lowering stroke of the gripper head, an actuator 206 on the frame of the gripper head will strike and actuate a pivoted valve opening member 207 so as to open a normally closed valve 208 which also is operatively connected to the single revolution clutch air motor 193 so as to effect a second actuation of such clutch and a final half revolution of the cam shaft. This second half rotation of the cam shaft and of the cams thereon will cause actuation of valve 169 to effect opening of the grippers and release of the containers of the charge to the underneath case and actuation of valve 170

to effect an upward stroke of the gripper head. When the gripper head reaches its raised position, the second of the rods 100 will have actuated the second of the bell crank levers 201 to transmit motion therefrom through linkage 209 to valve 171 so as to operate the case kicker air motor 56 to project the kicker head 54 against the adjacent side of the filled case so as to eject such case from the loading station.

It hereinbefore has been pointed out the actuation of the first of the bell crank levers 201 by its vertically movable rod 100 will actuate the valve 168 so as to throw in the intermittent conveyor clutch 159. When this happens, the clutch shifting lever 162 will actuate linkage indicated at 210, Fig. 15, to open the normally closed air valve 171 which is operatively connected to the case kicker cylinder so as to retract the case kicker and allow another empty case to come to a loading position.

Novel combinations and sub-combinations embodied in the forms of the machine shown in the drawings and hereinbefore particularly described may be included in still other forms. Thus, the machine may be adapted to pack containers having gable or other projecting grippable top portions simply by substituting a gripper mechanism having a pair of co-acting gripper members for each of the single gripper members of the illustrative machine and further substituting planar dead plate and trap-door section fingers for those having the plural-level features required for the formation and handling of charges of flat top containers. Other changes in and modifications of the particularly described embodiments of the invention will readily occur to those skilled in the art and we therefore do not wish to be limited to the details of such embodiments.

We claim:

1. In a machine for packing fiber milk containers or the like, a stationary platform provided with a loading opening through which a load-group of the containers may be lowered, a trap door comprising a plurality of cooperative pivoted sections mounted to swing about horizontal axes between raised, approximately horizontal closed positions above said loading opening, and lowered, approximately vertical open positions, said trap door being adapted to support said load-group of containers thereon when its sections are in their raised, closed positions and to permit said load-group to be lowered between the sections thereof when said sections are in their lowered, open positions, vertically movable means for gripping the load-group of containers on the trap door when the trap door sections are closed and for lowering said load-group through the trap door when its sections are open, means to present a case adapted to receive said load-group in a position below and in line with said loading opening, a load-group funnel movable vertically in said loading opening between a raised position completely above said case and a lowered position with the lower end of the funnel depending in said case, and motion-transmitting means interconnecting said vertically movable load-group lowering means, said funnel and said trap door sections to cause said funnel and said trap door sections to be lowered during the initial part of each downward stroke of the lowering means and raised during the final part of each upward stroke thereof.

2. In a machine for packing fiber milk containers or the like, a stationary platform provided with a loading opening through which a load-group of the containers may be lowered, a trap door comprising a plurality of cooperative pivoted sections mounted to swing about horizontal axes between raised, approximately horizontal closed positions above said loading opening, and lowered, approximately vertical open positions, said trap door being adapted to support said load-group of containers thereon when its sections are in their raised, closed positions and to permit said load-group to be lowered between the sections thereof when said sections are in their lowered, open positions, vertically movable means for

gripping the load-group of containers on the trap door when the trap door sections are closed and for lowering said load-group through the trap door when its sections are open, means for feeding the containers in a plurality of parallel, adjacent rows onto the raised trap door sections, and a gate carried by said load-group lowering means so as to be lowered by a downstroke of the lowering means from a raised, out of the way position to a lowered container movement blocking position across the path of further containers of said rows.

3. In a machine for packing fiber milk containers or the like, a platform having a loading opening therein through which a load-group of such containers may pass vertically, a trap door comprising a plurality of normally raised and horizontal pivoted sections mounted on the platform to receive and temporarily support such a load-group of containers in a position directly above and in line with the loading opening, said sections being swingable downwardly about horizontal pivotal axes to open a space between them through which the load-group may descend, a dead plate operatively associated with the trap door and an intermittently acting conveyor for the containers operable to feed containers over the dead plate onto said trap door, said trap door being adapted to support thereon a load-group consisting of a plurality of rows each containing a plurality of the containers when the trap door sections are raised and being constructed and arranged to support containers of different rows of said load-group at different levels.

4. The combination specified by claim 3 wherein said dead plate is formed and arranged to guide the containers of said different rows passing thereover onto said trap door at said different levels.

5. In a machine for packing load-groups of fiber milk containers of rectangular cross-sectional configuration, or the like, in cases, each load-group consisting of such containers arranged in a close order rectangular formation of four longitudinal rows and a plurality of transverse rows, a platform provided with a loading opening appropriate for such a load-group, means temporarily to under-support the containers of such a load-group in a position above and in line with the loading opening and so that the containers of the inner two longitudinal rows of the load-group formation are disposed with their upper end portions projecting above the corresponding portions of the containers of the outer longitudinal rows, a vertically movable load-group lowering mechanism disposed above said load-group and comprising normally disengaged pivotally mounted depending individual gripper fingers for the containers of the load-group, means to actuate said gripper fingers to cause them to engage their respective containers at the outer sides of the upper end portions only and jointly to clamp the containers of the several longitudinal rows together for suspension as a unit from the lowering mechanism, means to actuate the means for undersupporting said containers to remove undersupport therefrom and means to actuate the lowering mechanism to lower the load-group of containers through the loading opening to a waiting case at a station therebelow.

6. In a machine for forming containers of a plurality of parallel rows into a case load-group at one level and subsequently lowering the formed load-group to a waiting case therebelow, the combination of a temporary undersupport for the load-group comprising a pair of normally raised and horizontal pivoted trap-door sections openable downwardly to permit the load-group to be lowered therebetween, means to advance said plurality of parallel rows of containers onto said temporary undersupport at one edge thereof and on said undersupport toward the opposite edge thereof so that the containers on the undersupport are under line pressures, movable container row detectors disposed in the paths of leading containers of the several rows adjacent to said second named edge of the undersupport and stop means to limit movement of

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said movable detectors by said leading containers; said movement limiting means being constructed and arranged to release said movable detectors for further movement to relieve residual line pressures on the containers of the formed load-group when the sections of said undersupport are opened downwardly to permit lowering of the load-group therebetween.

7. In a machine of the character described, a normally raised, downwardly removable temporary undersupporting means for a load-group of containers, means to advance a plurality of parallel rows of the containers in close order formation by line pressures onto the undersupporting means, movable container row detectors disposed in the paths of the leading containers of said rows so as to be struck and moved by the rows of containers on the undersupporting means during the final part of the advance of said rows to form the load-group desired, and stop means to limit the movement of said container row detectors to stop the advance of the container rows on said undersupporting means when the load-group has been formed thereon, said stop means being arranged to release the detectors for further movement to relieve residual line pressures on containers of the formed load-group when said undersupporting means is removed downwardly to permit lowering of the load-group.

8. In a machine of the character described, a trap-door comprising a pair of normally raised and horizontal pivoted sections adapted to receive and support a multi-row load-group of containers thereon and swingable downwardly to permit lowering of the load-group therebetween, means to advance parallel rows of the containers under line pressures onto the raised trap door sections to form the load-group desired, pivoted container row detectors projecting into the paths of the container rows so as to be struck and moved about their pivotal axes by leading containers of said rows during completion of formation of said load-group, and stop means comprising cooperative elements carried by the pivoted detectors and one of the pivoted sections of the trap door in relative positions such that they strike each other and limit pivotal movement of the detectors by said containers as the load-group is formed and are disengaged to release the detectors for further pivotal movement to relieve residual line pressures on the containers of the load-group when the trap door sections are swung downwardly to permit lowering of the load-group therebetween.

9. In a machine for packing fiber milk containers or the like, a platform having a loading opening therein through which a load-group of such containers may pass vertically, a trap door comprising a plurality of normally raised and horizontal pivoted sections mounted on the platform to receive and temporarily support a load-group consisting of a plurality of rows each containing a plurality of the containers so that containers of different rows of said load-group are supported at different levels, said load-group being supported in a position directly above and in line with the loading opening, said trap door sections being swingable downwardly about horizontal pivotal axes to open a space between them through which the load-group may descend, a dead plate operatively associated with the trap door and an intermittent acting conveyor for the containers operable to feed containers in said rows over the dead plate onto said trap door, said dead plate being formed and arranged to guide the containers of said different rows passing thereover onto said trap door at said different levels, a vertically movable load-group lowering mechanism normally occupying a relatively raised position directly above the load-group on the trap door, said lowering mechanism being operable to grip all the containers of said load-group when the trap door sections are raised so as to suspend said load-group therefrom when the trap door sections are opened downwardly and further operable to lower the suspended load-group between the open trap door sections and through the loading opening, and a plurality of

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pivoted load-group row detectors corresponding in number with the rows of said load-group and arranged to be actuated when said rows have been filled with containers on the trap door to initiate operations of said load-group lowering mechanism.

10. In a machine for packing fiber milk containers of rectangular cross-sectional configuration, or the like, a trap door comprising a pair of normally raised and horizontal pivoted sections adapted to support thereon a load-group consisting of a plurality of longitudinal and a plurality of transverse rows of the containers pressed together in a close-order rectangular formation, said pivoted sections being openable downwardly to permit such a load-group to pass downwardly between them, and means to feed said plurality of longitudinal rows of said containers onto said trap door when the sections thereof are raised until sufficient transverse rows of the containers are on the trap door to form said load-group, said trap door sections being constructed and arranged so that the trap door when its sections are raised has a longitudinally extending middle portion adapted to support two adjacent longitudinal rows of the containers at one level and a pair of longitudinally extending further portions respectively located at opposite sides of the middle portion and each adapted to support a longitudinal row of the containers at a lower level.

11. In a machine for packing fiber milk containers of rectangular cross-sectional configuration, or the like, a trap door comprising a pair of normally raised and horizontal pivoted sections adapted to support thereon a load-group consisting of a plurality of longitudinal and a plurality of transverse rows of the containers pressed together in a close-order rectangular formation, said pivoted sections being openable downwardly to permit such a load-group to pass downwardly between them, and means to feed said plurality of longitudinal rows of said containers onto said trap door when the sections thereof are raised until sufficient transverse rows of the containers are on the trap door to form said load-group, said trap door sections being constructed and arranged so that the trap door when its sections are raised has a longitudinally extending middle portion adapted to support two adjacent longitudinal rows of the containers at one level and a pair of longitudinally extending further portions respectively located at opposite sides of the middle portion and each adapted to support a longitudinal row of the containers at a lower level, said container feeding means including a dead plate operatively associated with the trap door and having a higher level middle portion aligned with and at the same level as the middle portion of the trap door sections and lower level portions respectively located at opposite sides of the middle portion and aligned with the lower level portions of the trap door sections.

12. In a machine for packing fiber milk containers of rectangular cross-sectional configuration, or the like, a trap door comprising a pair of normally raised and horizontal pivoted sections adapted to support thereon a load-group consisting of a plurality of longitudinal and a plurality of transverse rows of the containers pressed together in a close-order rectangular formation, said pivoted sections being openable downwardly to permit such a load-group to pass downwardly between them, and means to feed said plurality of longitudinal rows of said containers onto said trap door when the sections thereof are raised until sufficient transverse rows of the containers are on the trap door to form said load-group, said trap door sections being constructed and arranged so that the trap door when its sections are raised has a longitudinally extending middle portion adapted to support two adjacent longitudinal rows of the containers at one level and a pair of longitudinally extending further portions respectively located at opposite sides of the middle portion and each adapted to support a longitudinal row of the containers at a lower level, said relatively higher level

middle portion of the raised trap door sections and the lower level further portions thereof respectively comprising higher and lower level sets of transversely spaced aligned supporting fingers.

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