Aug. 7, 1962 W. DU BROFF 3,047,990

CASER FOR CARTONS

Filed May 23, 1960 6 Sheets-Sheet 1

Fig. 1.

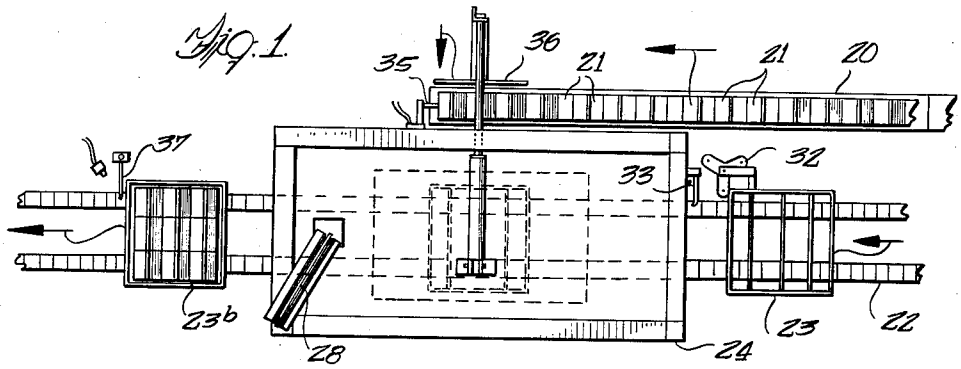


Fig. 2.

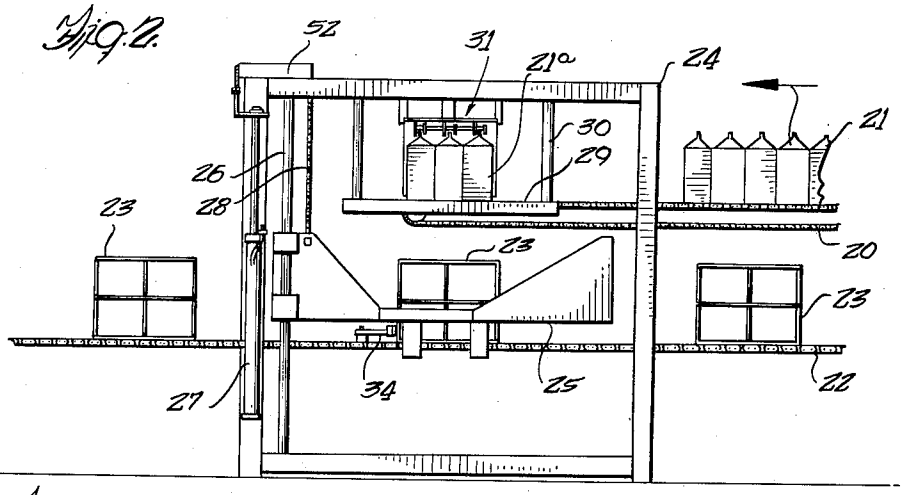
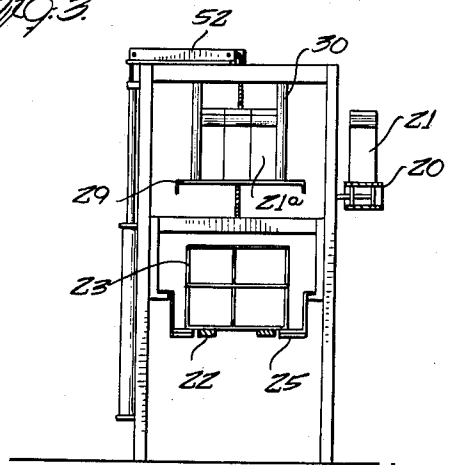


Fig. 3.



Inventor
Warren Du Broff

Dawson, Dilton, Fallon & Lungmus
Attorneys

Aug. 7, 1962 W. DU BROFF 3,047,990

CASER FOR CARTONS

Filed May 23, 1960 6 Sheets-Sheet 2

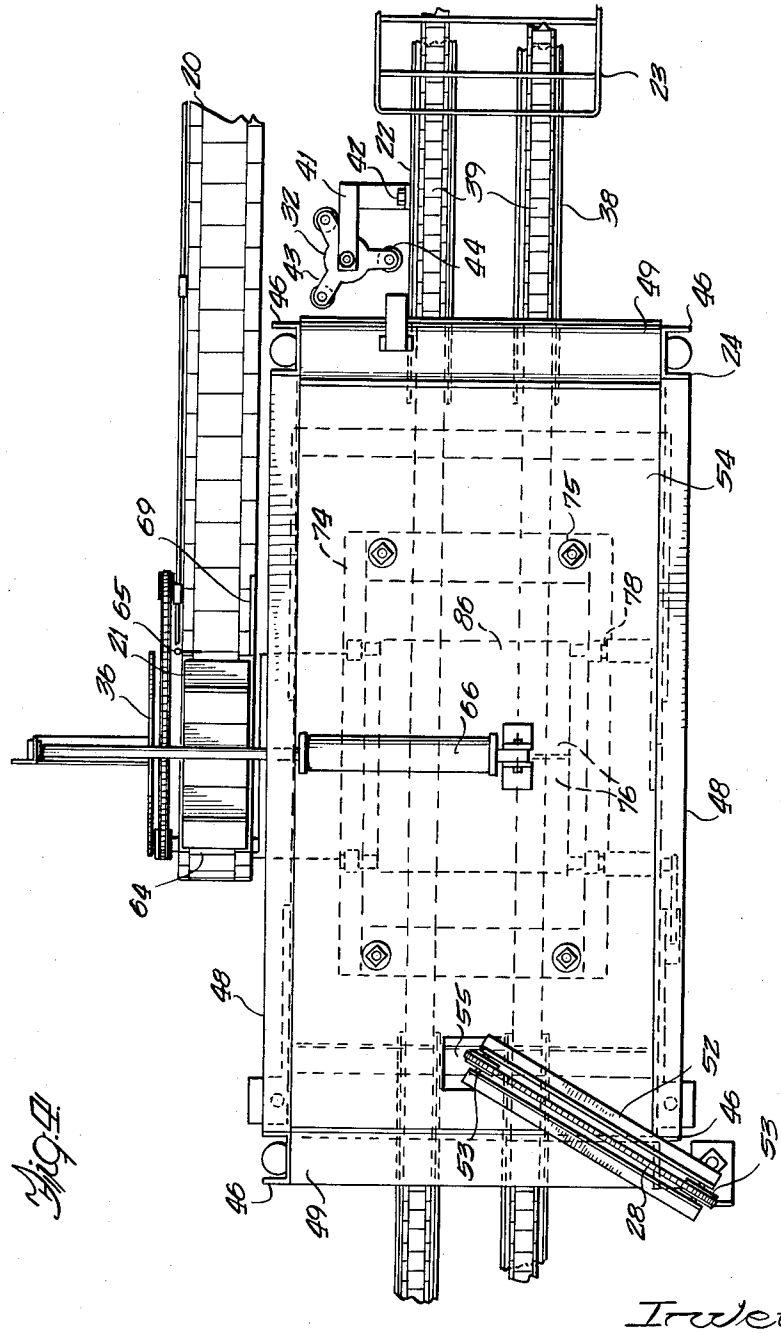


Fig. 4

Inventor
Warren Du Broff

Dawson, Dillon, Fallon & Lungmus
Attorneys

Aug. 7, 1962 W. DU BROFF 3,047,990

CASER FOR CARTONS

Filed May 23, 1960 6 Sheets-Sheet 3

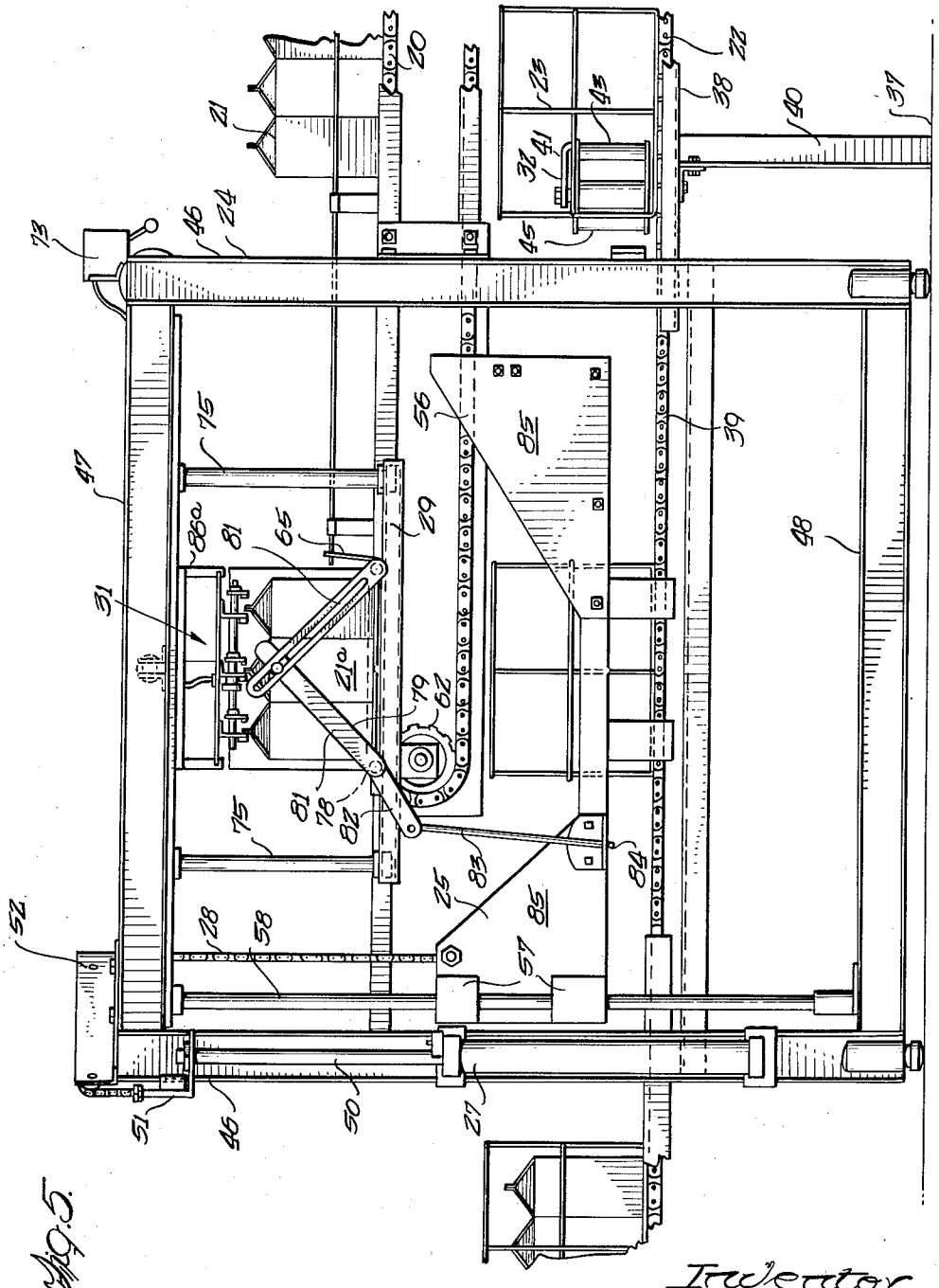


Fig. 5

Inventor
Warren Du Broff
Dawson, Zilton, Fallon & Lungmus
Attorneys

Aug. 7, 1962 W. DU BROFF 3,047,990

CASER FOR CARTONS

Filed May 23, 1960 6 Sheets-Sheet 4

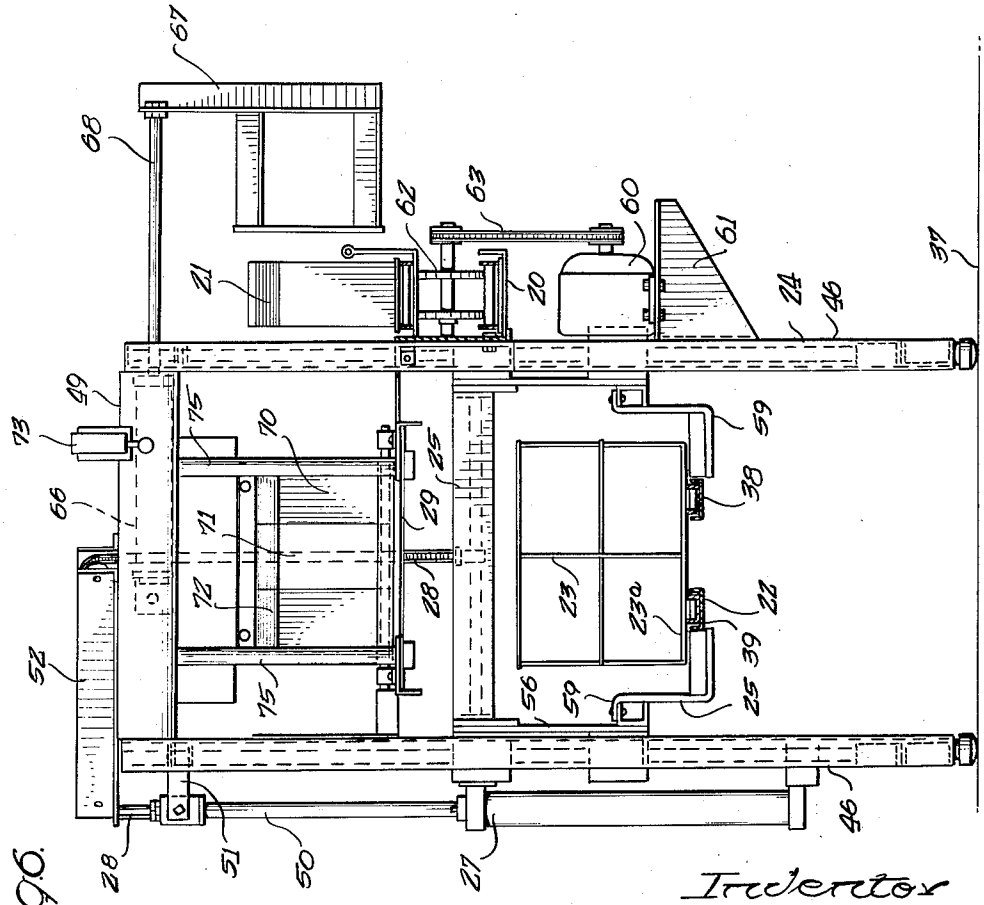


Fig. 6.

Inventor
Warren Du Broff
Dawson, Dillon, Fallon & Lungmus
Attorneys

Aug. 7, 1962 W. DU BROFF 3,047,990

CASER FOR CARTONS

Filed May 23, 1960 6 Sheets-Sheet 5

Fig. 7.

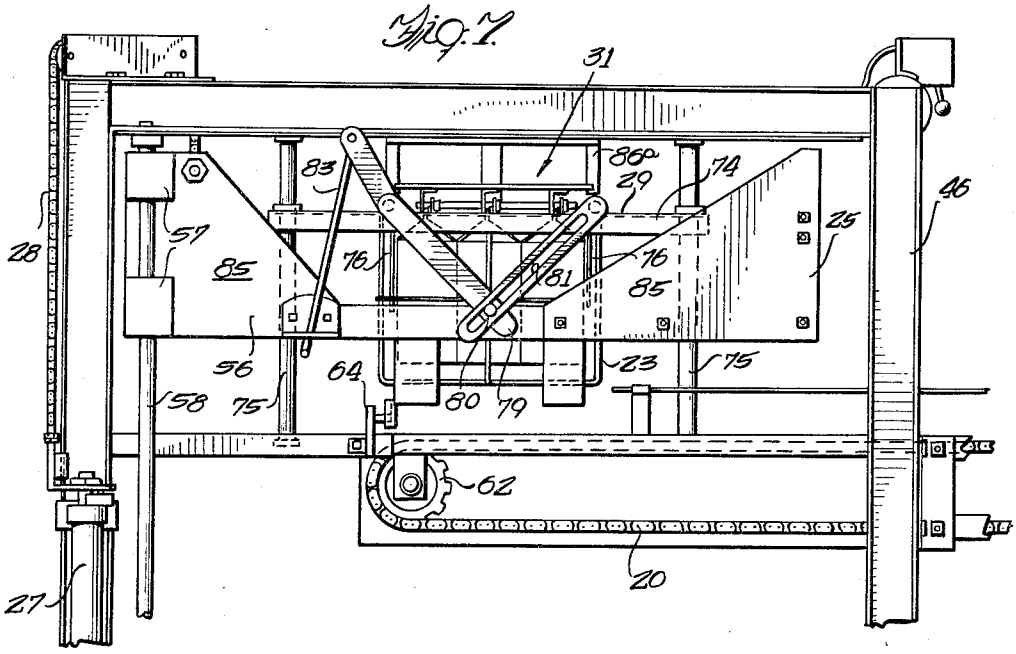


Fig. 8.

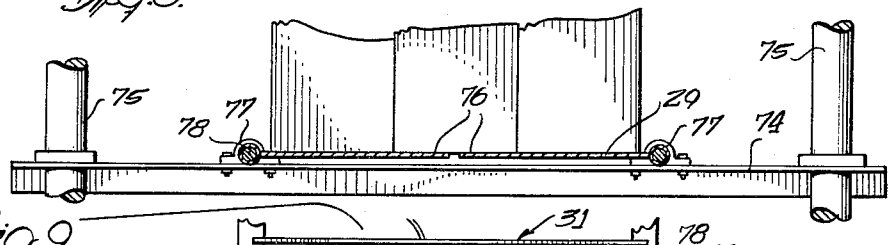
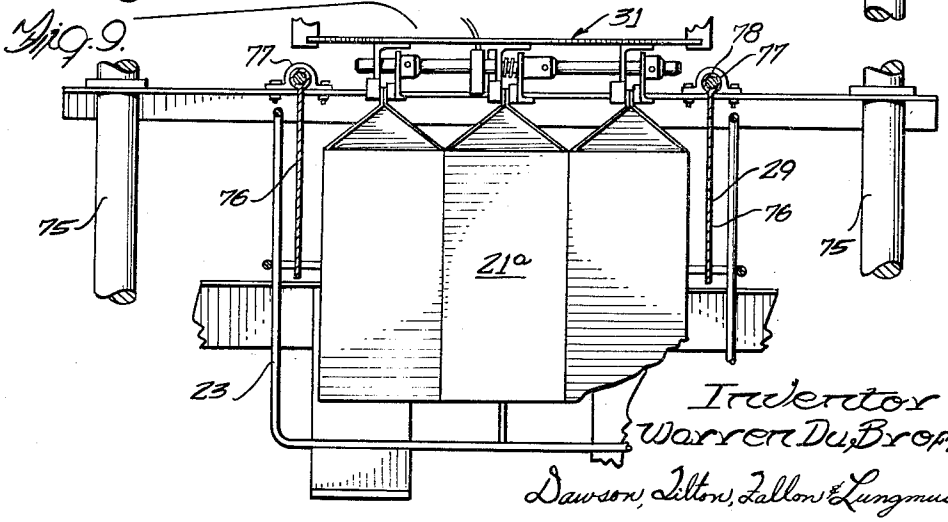


Fig. 9.



Inventor
Warren Du Broff
Dawson, Dilton, Dallon & Lungmus
Attorneys

Aug. 7, 1962 W. DU BROFF 3,047,990

CASER FOR CARTONS

Filed May 23, 1960 6 Sheets-Sheet 6

Fig. 10.

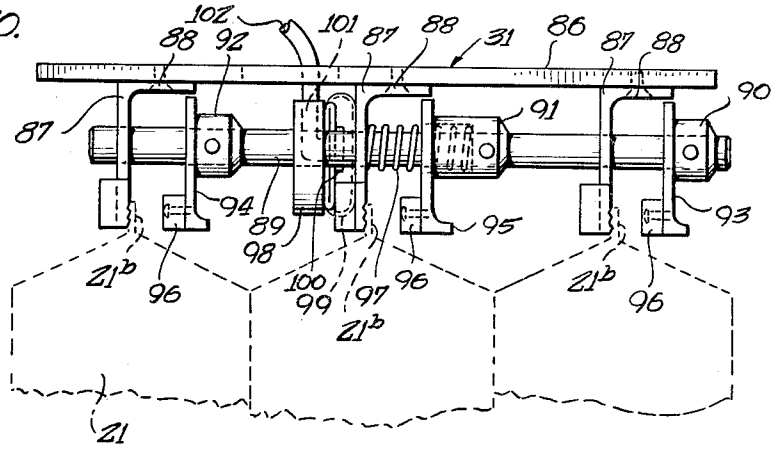
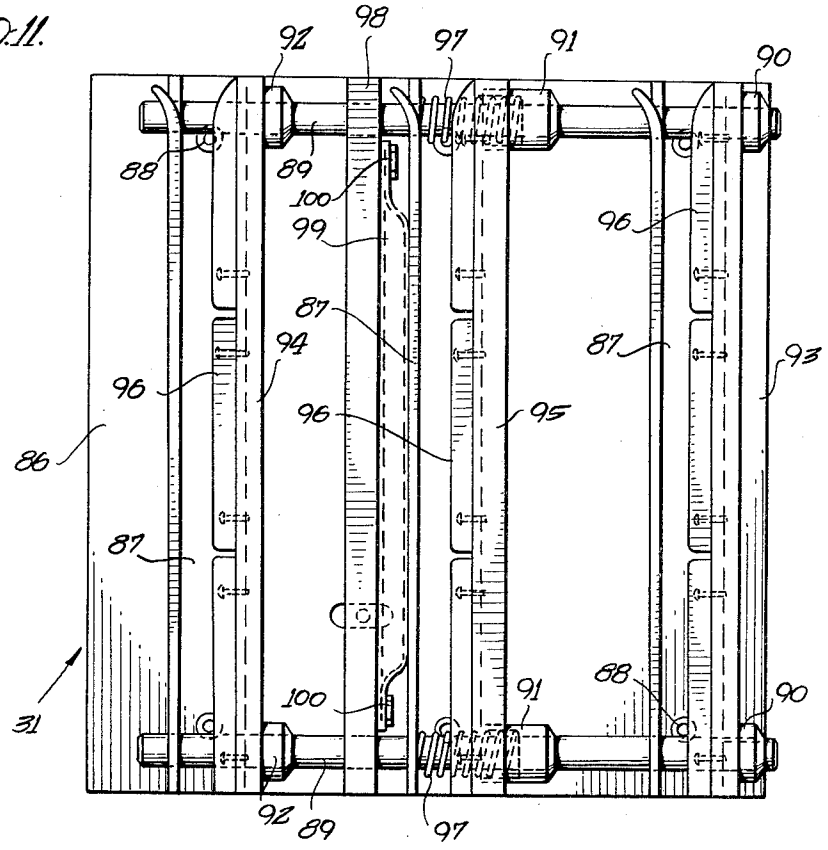


Fig. 11.



Inventor
Warren Du Broff
Dawson, Dilton, Fallon & Lungmus
Attorneys

United States Patent Office

3,047,990
Patented Aug. 7, 1962

3,047,990

CASER FOR CARTONS

Warren Du Broff, Chicago, Ill.
(350 Carol Court, Highland Park, Ill.)

Filed May 23, 1960, Ser. No. 30,797
13 Claims. (Cl. 53—166)

This invention relates to a caser for cartons, and, more particularly, to a caser for cartons which are characterized by the presence of an upstanding rib developed by folding the carton top wall on itself.

In a dairy or other bottling works, it is necessary that the individual containers be grouped and placed into a case for subsequent distribution. It is with such an operation that the invention here is concerned. The invention has specific application to paperboard containers for milk, soft drinks, etc., which are to be deposited into uncompartmented cases such as the conventionally-employed rectangular wire baskets.

The handling of paperboard containers of the character indicated has presented problems which were not characteristic of the operation when glass bottles were deposited into compartmented wooden cases. The presently-employed cartons are necessarily somewhat flexible or yielding, and hence much more easily rupturable. This relative delicacy of the units being handled has led to the provision of complicated mechanisms for achieving the encasing which are difficult to maintain in use. Although dairies, bottling works, etc. do employ complex mechanisms for the cleaning, filling and closing operations, these mechanisms are more readily maintained, since they operate on single units in a controlled fashion. The casing operation (which may be considerably removed from the other operations) is one that is characterized by a considerably greater degree of roughness—the containers must be literally moved and incorporated into a case, which could result in clashing, smashing, etc.

It is, therefore, a principal object of this invention to provide a novel casing apparatus that is relatively simple in construction so as to be better able to withstand the unusual stresses to which it is subjected by virtue of the casing operation. Another object is to provide casing apparatus which is effective to operate at high speed and through a relatively simple cycle so as to accommodate the casing operation to the speed of the other operations carried on in the plant where the caser is used.

In the handling of the flexible containers mentioned above, misoperation of the apparatus during the casing step may result in rupture of a container, with the attendant halting of an entire bottling operation. The problems of cleaning up milk or other liquid are not only vexatious, but the milk itself could interfere with the operation of the various mechanisms, as by causing moving parts to stick, and the like.

Still another object of the invention is to provide an apparatus which avoids the problem just outlined, in that the mechanism is arranged to present maximum safeguards against the inadvertent rupture of a flexible container or carton being deposited into a case. Yet another object is to provide a caser in which a platform is provided to support a group of cartons prior to the casing step and in which the platform itself serves as a guide or stabilizing means during the carton deposit.

A further object is to provide a novel suspending and

supporting mechanism within a caser which is effective to stabilize a group of cartons in both horizontal directions while the cartons are being moved vertically for the casing operation.

A still further object is to provide a novel casing apparatus which is effective to bring together a group of cartons sequentially delivered to the apparatus and stabilize the same while the group is being deposited into a case, means being provided in the apparatus for regulating inflow of both the cartons and the cases so that the positions of the two are adjusted for most advantageous operation.

Other objects and advantages of this invention may be seen in the details of construction and operation set down in this specification.

The invention will be explained in conjunction with an illustrative embodiment in the accompanying drawing, in which—

FIG. 1 is a fragmentary top plan view of apparatus embodying the invention; FIG. 2 is a fragmentary side elevational view of the apparatus seen in FIG. 1; and FIG. 3 is a fragmentary end elevational view of the apparatus of FIGS. 1 and 2, the three views just described being shown on sheet 1 of the drawing and in limited detail so as to permit quick appreciation of the apparatus operation.

FIG. 4 is an enlarged fragmentary plan view of the apparatus and corresponds to the showing in FIG. 1;

FIG. 5 is an enlarged fragmentary side elevational view corresponding to the showing in FIG. 2;

FIG. 6 is an enlarged fragmentary end elevational view corresponding to the showing in FIG. 3, FIGS. 4, 5 and 6 being each presented on individual sheets of the drawing.

FIG. 7 is an enlarged fragmentary side elevational view showing the carton-supporting platform and its associated mechanism in greater detail than the showing of FIGS. 2 and 5, which present views from the same elevation; FIG. 8 is a fragmentary side elevational view, partially in section, of the carton-supporting platform referred to above; and FIG. 9 is a view similar to FIG. 8 but showing the platform in a different operating condition and also showing the mechanism for gripping the carton.

FIG. 10 is an enlarged fragmentary side elevational view of the gripping mechanism seen also in FIG. 9; and FIG. 11 is an enlarged bottom plan view of the gripping mechanism of FIG. 10, FIGS. 10 and 11 being on a single sheet of the drawing, as are FIGS. 7, 8 and 9.

In the illustration given, and with particular reference to FIGS. 1–3 on sheet 1 of the drawing, the numeral **20** designates a carton conveyor on which cartons **21** are being advanced toward a frame **24**, cases **23** and also being advanced to the frame **24** as on the case conveyor **22**.

The numeral **25** designates a carriage (see FIGS. 2 and 3) which is reciprocably mounted within the frame **24** on tracks or ways **26**. This carriage **25** is moved under the influence of an air cylinder **27** (also mounted on frame **24**) which is connected to the carriage **25** by means of a chain **28**. It will be seen that the carriage **25** supports a case **23**, as can be quickly appreciated from a consideration of FIG. 3. Thus, a principal function of the carriage **25** is to raise the case **23** into an enveloping relation with the cartons **21** which are grouped

together as at 21*a* (FIGS. 2 and 3) on a platform 29. The platform 29 is supported on the frame 24 for movement on guides 30. Positioned on frame 24 above the platform 29 is a carton-gripping mechanism generally designated 31.

In general, the operation of the device thus far broadly described comprehends the introduction of a case 23 into the frame 24. A case 23, in proceeding along the conveyor 22, first encounters a case hold-back mechanism 32 (see FIG. 1). The mechanism 32 is arranged to permit entry of a case 23 only after a previous case has left the apparatus so that one case will not interfere with another. For this purpose, a locking mechanism 33 is provided on the frame 24 which immobilizes the mechanism 32 after it has permitted a case to enter the frame 24. A case-immobilizing lock 34 (see FIG. 2) is provided within the frame 24 and serves to position a case 23 in a manner for subsequent upward movement for enveloping the group of cartons 21*a*. The group of cartons 21*a* is provided through the operation of a carton pusher 36 which is energized by a carton switch 35 (see FIG. 1). In the illustration given, the case is adapted to hold nine cartons, which may be conveniently provided as a group through the operation of the pusher 36 delivering three subgroups of three cartons each to the platform 29.

Before the carriage 25 rises under the influence of the air cylinder 27 so as to engage the platform 29 and cause the platform 29 to rise with it, the carton group 21*a* is suspended by the gripping members of the gripping mechanism 31. The mechanism 31 suspends the carton group 21*a* while the platform 29 is removed from under the cartons, permitting the cartons to be deposited in the case 23. This particular phase of the operation can be seen most clearly relative to FIGS. 7–9, and will be described in greater detail in connection therewith subsequently in this specification. After the group 21*a* is deposited, the carriage descends and the case issues from the frame on the continuously moving conveyor 22, energizing switch arm 37 which conditions the mechanism for another casing operation.

By referring to FIGS. 4–6, it will be seen that the frame 24 is essentially a rectangular network positioned astride the case conveyor 22. The case conveyor 22 is seen to be supported above the floor 37 on tracks 38, the conveyor 22 including a pair of link chains 39 which are spaced within the width of a case 23 (see FIG. 4). This permits the sides of the case 23 to overlap or extend beyond the conveyor chain 39 as at 23*a* in FIG. 6—this permitting the carriage 25 to engage the case 23 and elevate the same. In the illustration given, the tracks 38 are supported on suitable pedestals 40 (see FIG. 5), but it will be appreciated that in individual instances it may be desirable to have the case conveyor 22 proceed along the floor 37.

A case 23, in proceeding along the conveyor 22, is prevented from entering the frame 24 by virtue of the hold-back mechanism 32. The hold-back mechanism 32 includes a bracket 41 (see FIGS. 4 and 5) which is secured to the pedestal 40 by means of bolts 42 (see FIG. 4). Rotatably supported within the bracket 41 is a ratchet member 43. As best seen in FIG. 4, the ratchet member 43 includes three arms 44, each of which is equipped with a roller 45 (see FIG. 5). The ratchet member 43 is rotated by a suitable air cylinder, or the like (not shown), and serves to permit one case 23 to pass by the hold-back mechanism 32 upon a suitable signal from the arm of exit switch 37 (see FIG. 1). A signal from the exit switch 37 releases the ratchet member 43 for rotation, and this condition continues until the case 23 engages the hold-back or locking switch 33 (FIG. 1). Thus, as soon as a case 23 passes by the hold-back mechanism 32, one of the arms 44 is positioned with its roller in blocking relation with the subsequent case 23.

The frame 24, as can be appreciated from a comparison of FIGS. 4 and 6, includes four columns 46 which are arranged to permit the case conveyor 22 to pass through the frame 24. The columns 46 are tied together by longitudinal stringer members 47 and 48 (see FIGS. 4 and 5) and by transverse stringer members 49 (see FIGS. 4 and 6).

The chain 28 is connected at one end, as mentioned above, to the piston rod 50, through bracket 51, and at its other end is connected to the carriage 25 (see FIGS. 5 and 6). A way 52 is provided for the chain 23, the way 52 in turn carrying sprockets 53 (see FIG. 4), over which the chain 28 is entrained. The top of the frame 24 is closed by a plate 54 (see FIG. 4), and the plate is equipped with an aperture 55 through which the chain 28 passes. The top plate 54 provides a convenient mounting area for the various controls, valves, etc., associated with the casing apparatus.

The carriage 25 includes a subframe 56 (see FIG. 5) which at one end is equipped with sleeve bearings 57. The sleeve bearings 57 are mounted on rods 58 which extend vertically of the frame 24 and are rigidly connected thereto. Thus, under the influence of the air cylinder 27, the subframe 56 is enabled to move vertically in a guided fashion through the cooperation of the sleeve bearings 57 and the rods 58. The subframe 56, as can be best appreciated from a consideration of FIG. 6, is equipped with inwardly-extending arm members 59. The arm members 59 extend toward each other in a manner such as to engage the bottom of a case 23 outwardly of the conveyor tracks 38. The air cylinder 27 is actuated after a group of cartons 21*a* has been properly positioned within the frame 24, and the mechanism for performing that phase of the cyclic operation will now be described.

The cartons 21 are advanced along the conveyor 20 toward the frame 24, the conveyor 20 being operated by an electric motor 60 (see FIG. 6) suitably supported on a bracket 61 provided as part of frame 24. In the illustration given, the conveyor 20 is driven by means of sprockets 62 which are powered, in turn, through a chain drive 63. The cartons 21 are advanced on the conveyor 20 until an abutment member 64 (see FIG. 4) is reached, after which the cartons cease their forward movement while the conveyor 20 passes thereunder. The frame 24 is equipped with a carton-sensing member 65 which is mounted for pivotal movement out of the path of carton 21 approaching the abutment member 64. When the sensing member 65 is actuated by being in contact with a carton 21 and when a sensing mechanism (not shown) associated with abutment member 64 is also actuated, the carton pusher 36 is energized to move a group of cartons inwardly of the frame 24.

In the illustration given, the pusher is sized to push a group of three cartons laterally inwardly of the frame 24, and for this purpose the top plate 54 is equipped with an air cylinder 66 (see FIGS. 4 and 6) which has a depending bracket 67 affixed to the end of the piston rod 68 (see FIG. 6). As the carton pusher 36 is moved to shift cartons 21 inwardly of the frame 24, a suitable lock-out mechanism (not shown) is employed to temporarily pivot the sensing member 65 so as to retard a subsequent carton by urging the same against a rail 69 (see FIG. 4). This condition persists until the pusher 36 is returned to the position seen in FIGS. 4 and 6.

As the three cartons are moved inwardly of the frame 24, they become supported on a platform 29. The first group of three cartons 21 are pushed by the bracket 67 a distance such that they occupy the position designated by the numeral 70. The second group of three cases is pushed the same distance, during which time the first group moves to the position designated 71 in FIG. 6. The third pushing operation results in the first group of three cartons occupying the position designated 72 in FIG. 6, and at this time the platform is loaded with nine cartons forming the group designated 21*a*. The third

pushing movement is sensed by the element 73 (see FIG. 6), and this in turn provides a signal for the actuation of the air cylinder 27.

The platform 29 can be seen most clearly in FIGS. 7–9, and there is seen to include a rectangular frame 74 which is journaled for vertical reciprocatory movement on posts 75. The posts 75 are suitably anchored from the upper portion of the frame 24, being unattached at their lower ends except for the stabilization provided by the platform frame 74. The platform frame 74, in its central portion (i.e., above the position occupied by a case 23 during the casing operation) is equipped with a pair of pivotally mounted plates 76 (see FIGS. 8 and 9). For this purpose, the platform 74 is equipped with bearings 77 and the plates 76 are rigidly connected to rods 78 which are mounted within the bearings 77. The rods 78 extend beyond the bearings 77 and are rigidly connected to linkage elements 79 (see FIG. 7). One element 79 is slotted as at 81, and the two elements are tied together by means of a pin 80 in the other member 79 which rides in the slot 81. The rod 78 of one linkage element 79 (that carrying pin 80) is equipped with a rigidly coupled link 82 (see FIG. 5), and the link 82 in turn is pivotally connected to a linkage rod 83, the lower end of which is slidably secured to the carriage 25 as at 84.

As the carriage 25 is raised under the influence of air cylinder 27, the linkage rod 83 is ultimately elevated to the condition seen in FIG. 7 and the plates 76 pivoted downwardly and within the case 23, permitting the cartons 21 to be deposited therein. This condition of the plates 76 can also be seen by reference to FIG. 9.

Prior to the time the plates are opened, the cartons 21 are suspended by the gripping mechanism 31 to position the cartons 21 in a position for deposit into case 23. Thereafter, the platform 29 is raised upwardly under the influence of the subframe 56 of the carriage 25. For this purpose, the subframe 56 is equipped with wedge walls 85 (see FIGS. 5 and 7), which engage the platform 29 in the manner seen in FIG. 7.

During the raising of the platform 29 and the coincident pivoting downward of the plates 76, the cartons 21 are gripped in the gripping mechanism in the fashion seen in FIG. 9. The gripping mechanism itself can be seen in greater detail in FIGS. 10 and 11. Referring now to FIGS. 10 and 11, the numeral 86 designates a plate which is secured within a hanger 86*a* (see FIGS. 5 and 7) extending downwardly from the top plate 54 of the frame 20. Three elongated angle members 87 are secured to the plate 86 as by bolts 88. Extending through the depending flanges or arms of the angles 87 are guide rods 89, the rods 89 being equipped with collars 90, 91 and 92. The collars 90 and 92 are substantially identical and are secured to jaw members 93 and 94, respectively. The collar 91 is secured to the jaw member 95. Each of the jaw members 93–95 is equipped with a series of gripping pads 96 which cooperate with the angle members 87 in gripping the upstanding rib 21*b* of a carton 21. Urging the jaw members 93–95 away from the angles 87, are coiled springs 97 mounted on rods 89 and extending between the collars 91 and the central angle member 87.

Secured to the rods 89 adjacent the spring bearing angle member 87 is a cross member 98. The cross member 98 has a length of tubing 99 secured thereto as by bolts 100 (see FIG. 11). The member 98 is equipped with an air channel 101 which communicates with a source of compressed air (not shown) through tubing 102. When the tubing or hose 99 is pressurized, it is effective to urge the member 98 away from the spring bearing angle 87 and to urge the jaw members 93–95 into clamping relation with the stationary angle members 87 to grip the upstanding ribs 21*b* of the cartons 21.

As can be appreciated from the description thus far given, the essential operative steps of the casing operation involve grouping the cartons in groups of 9, 12, 16, etc., depending upon the size of the case employed. Thereafter, the cartons are suspended by means of gripping the upstanding ribs while the case is raised upwardly to receive the cartons. The gripper is then released to deposit the cartons in the case, whereupon the case descends and exits from the apparatus.

More specifically, the operation of the apparatus contemplates the continuous running of the conveyors 20 and 22 to insure automatic operation of the caser apparatus and accept the output of a continuously-operating bottling line. The case 23 within the frame 24 is maintained in position by the case-immobilizing mechanism 34 so that the case 23 is in position for elevation to receive the cartons grouped as at 21*a*. After descent of the carriage 25 and the filled case 23, the case-immobilizing mechanism 34 is deactivated to permit the continuously moving conveyor 22 to carry the now-filled case 23 out of the frame 24. The exiting case 23*b* (see FIG. 1) engages the exit switch 37, which is effective to reset the caser for filling of a subsequent case 23.

Whenever the size of the carton 21 is to be changed, the caser is readily modified for this purpose, since the plate 86 of the gripping mechanism 31 can be readily removed from the hanger 86*a* merely by disconnecting air line 102 and sliding the plate out of the hanger 86*a*. Suitable bolts may be provided for releasably locking the plate 86 in the hanger 86*a*. The gripping mechanism 31 is thus seen to occupy a minimum of space within the frame 24, and through the provision of the resilient tubing or bag 99 provides a uniform gripping action on all of the carton ribs 21*b* being suspended while the case is being brought into enveloping relation therewith. Also, the hose or tubing 99 may be considered to be the major wearable item in the gripping mechanism 31, and this can be readily replaced merely by removing the bolts 100 and substituting a new length of tubing. No special structural modifications of tubing are seen to be required in the illustration given, since the bolts 100 serve to compress the ends of the tubing 99, as can be appreciated from a consideration of FIGS. 10 and 11. In fact, excellent results are obtained through using tubing such as fire hose which is entirely adequate for the air pressures (60–100 p.s.i.) employed.

The employment of the fluid-actuated resilient tubing 99 eliminates the need for employing levers or other linkages to bring about the gripping action. Linkages such as those just mentioned have a tendency to magnify vribrations of the frame which naturally occur because of the harsh shocks to which the frame and other associated equipment in the caser are subjected. Essentially, the operation contemplated here is a harsh one because the outputs of two conveyors are being brought together just prior to being released for shipment.

It is also to be noted that the trapdoor-like plates 76 swing in an arc perpendicular to the ribs 21*b* so as to stabilize the carton group 21*a* in the direction in which it is most likely to deflect or deform and thus accidentally engage the case 23 as the same is rising into enveloping relation with the carton group 21*a*. The cartons 21, being gripped as they are, are relatively stable against any displacement in a direction parallel with the length of the ribs 21*b*, so that the folding platform not only supports the cartons prior to transfer into the case but guides them into the case Further, the folding platform 29 permits the case to rise up into substantially enveloping relation with the cartons 21 so that the release of the gripper mechanism 31 results in only a slight drop of the carton, in practice only about ¼″ or so.

While, in the foregoing specification, I have set forth a detailed description of an embodiment of the invention for the purpose of explanation thereof, many variations in the details herein given will be appreciated by those skilled in the art without departing from the spirit and scope of the invention.

I claim:

1. In apparatus for simultaneously loading cases with a plurality of cartons each having an upstanding rib, a frame, means for positioning a case within said frame and for elevating the same, a rib-gripping head removably mounted in said frame aligned with a case positioned by said positioning means, said gripping head comprising a plate having a plurality of depending, elongated flanges secured thereto in spaced-apart, parallel relation, a plurality of rods extending through said flanges and slidably mounted therein, a jaw member for each flange anchored to said rods, abutment means extending between said rods and secured thereto, an inflatable member positioned between said abutment means and one of said flanges and operative to move said jaw elements and flanges into clamping relation, means extending between one of said flanges and one of said jaw elements operative to move said jaw elements and flanges out of clamping relation, means for internally pressurizing said inflatable member to overcome the means urging said flanges and jaw elements out of clamping relation, and means for positioning a plurality of cartons under said gripping head in a regular arrangement for clamping engagement by said flanges and jaw elements.

2. The structure of claim 1 in which said inflatable member is secured to said abutment means, a fluid pressure conduit communicating with the interior of said inflatable member, and hanger means on said frame releasably engageable with said plate.

3. The structure of claim 1 in which said case-positioning means includes trapdoor means pivotally mounted on said frame for movement into a case being elevated in said frame.

4. The structure of claim 3 in which a carton conveyor is positioned adjacent said frame, means on said frame adapted to engage a plurality of cartons on said carton conveyor for shifting the same onto said trapdoor means.

5. The structure of claim 1 in which said case positioning means includes a subframe mounted for vertical movement in said frame, trapdoor means in said subframe, and a case carriage reciprocably mounted in said frame effective to open said trapdoor means.

6. In case apparatus of the character described, a frame, a case conveyor extending through said frame, a carton conveyor adjacent said frame and above said case conveyor, a platform within said frame adapted to receive cartons from said carton conveyor, carton shifting means on said frame adapted to provide a case conforming group of cartons on said platform, a carton-gripping head on said frame above said platform, a plurality of sets of gripping jaws depending from said head to clamp cartons supported on said platform, an inflatable member on said head adapted to simultaneously urge said sets into clamping relation, a carriage mounted for vertical movement in said frame about said case conveyor, a case support on said carriage, means for raising said carriage and a case supported thereon, and trapdoor means in said platform movable into a case supported by said carriage when said carriage is raised.

7. The structure of claim 6 in which said platform is mounted for vertical movement in said frame, whereby a case on said carriage is adapted to overlap said gripping head and limit the free fall of cartons released from said head.

8. In case apparatus of the character described, a frame, an endless, continuously-moving case conveyor extending through said frame, an endless, continuously-moving carton conveyor adjacent said frame and above said case conveyor, a trapdoor-equipped platform mounted for vertical movement within said frame and adapted to receive cartons from said carton conveyor, carton-shifting means on said frame adapted to provide a case conforming group of cartons on said platform, a carton-gripping head on said frame above said platform, a plurality of sets of gripping jaws depending from said head to clamp cartons supported on said platform, an inflatable member on said head adapted to simultaneously actuate said sets into clamping relation with cartons on said platform trapdoor, and a carriage mounted for vertical movement in said frame about said case conveyor, a case support on said carriage, means for raising said carriage and a case thereon, and means mounting said trapdoor on said platform for movement through a vertical arc effective to stabilize cartons being introduced into a case on said carriage.

9. In case apparatus of the character described, a frame, an endless, continuously-moving case conveyor extending through said frame, an endless, continuously-moving carton conveyor adjacent said frame and above said case conveyor, a trapdoor-equipped platform mounted for vertical movement within said frame and adapted to receive cartons from said carton conveyor, carton-shifting means on said frame adapted to provide a case conforming group of cartons on said platform, means for sequentially energizing said shifting means to transfer subgroups of cartons from said carton conveyor to said platform trapdoor, a carton-gripping head on said frame above said platform, a plurality of sets of gripping jaws depending from said head to clamp cartons supported on said platform trapdoor, an inflatable member on said head adapted to simultaneously urge said sets into clamping relation with cartons on said platform trapdoor, a carriage mounted for vertical movement in said frame about said case conveyor, a case support on said carriage, means responsive to the formation of groups of cartons on said trapdoor for inflating said inflatable member so as to urge said jaws into clamping relation and for elevating said carriage, and means actuated by the elevation of said carriage to open said trap door and actuated by the lowering thereof to close said trap door.

10. In casing apparatus, a frame, means for vertically reciprocating a case within said frame, gripping means on said frame above a case positioned for elevation by said reciprocating means, said gripping means including a plurality of pairs of spaced-apart jaw elements adapted to clampingly engage a plurality of upstanding ribs on cartons to be cased, one element of each pair being movable in said frame, with the other element of each pair being stationary, rod means extending through said elements for guiding the movement of the movable elements, and fluid pressure means for urging said elements into clamping relation, said fluid pressure means including a bar fixed to each rod means and a resilient inflatable tube positioned between said bar and one of the stationary elements.

11. The structure of claim 10 in which said tube is a hose member secured to said bar at the hose member ends, bolt means extending through said hose member to provide the securement thereof and to close said hose member ends.

12. In caser apparatus for the character described, a frame, a carriage in said frame mounted for vertical movement, a case support on said carriage, means for raising said carriage on a case support thereon, a platform on said frame above said carriage and also mounted for vertical movement, trapdoor means in said platform openable by upward movement of said carriage and closable by downward movement thereof, and a gripping head above said platform adapted to suspend cartons positioned on said trap door means and grippingly engaging upwardly-extending elongated ribs on said carton when said ribs are aligned in parallel relation, said platform and said trapdoor means being movable under the influence of said carriage to a position permitting a case on said carriage to overlap said gripping head and thus limit the drop of cartons suspended by said gripping head, said trapdoor means comprising a pair of plates pivotally mounted on said platform, linkage means coupling said carriage and trapdoor means operative to open said trapdoor means on upward movement of said carriage after

said ribs have been gripped by said head and close the same upon carriage descent after said cartons have been released by said head, said linkage means being operative to pivot said trapdoor means into said case to confine cartons against movement lateral to the length of said ribs.

13. The structure of claim 12 in which said gripping head includes elongated jaw elements arranged for movement relative to each other, an inflatable member on said head for urging said jaw elements toward each other, the axis of rotation of said plates being parallel to the length of said jaw elements.

References Cited in the file of this patent

UNITED STATES PATENTS

2,549,004	Pomeroy et al.	Apr. 17, 1951
2,681,171	Brown et al.	June 15, 1954
2,838,896	Currivan et al.	June 17, 1958
2,898,715	Cella	Aug. 11, 1959
2,939,256	Nigrelli et al.	June 7, 1960

FOREIGN PATENTS

810,795	Great Britain	Mar. 25, 1959