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Doran et al.

[11] **3,914,921**

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[54] **HIGH SPEED CARTON CASING APPARATUS**

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[73] Assignee: **Windor, Incorporated,** Danbury, Conn.

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[52] **U.S. Cl.** ..... **53/159;** 53/247; 198/24; 198/31 AB

[51] **Int. Cl.²** **B65B 5/08;** B65B 35/40

[58] **Field of Search** ..... 53/61, 62, 164, 165, 166, 53/247, 159; 198/24, 31 AB

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Primary Examiner—Robert L. Spruill
Attorney, Agent, or Firm—Smythe & Moore

[57] **ABSTRACT**

A casing apparatus marshalls a number of cartons into a tier for positioning into a case and includes a loading table onto which a row of cartons are fed and a horizontal carrier adjacent the table. A pusher is actuated to push cartons from the loading table transversely of the row onto a horizontal carrier with the cartons being pushed against a retaining bar which assists in maintaining the cartons in their upright position. When a predetermined number of cartons has been pushed onto the horizontal carrier to form a tier, the retaining bar is pivoted upwardly to release the tier of cartons which may then be moved into a case.

4 Claims, 6 Drawing Figures

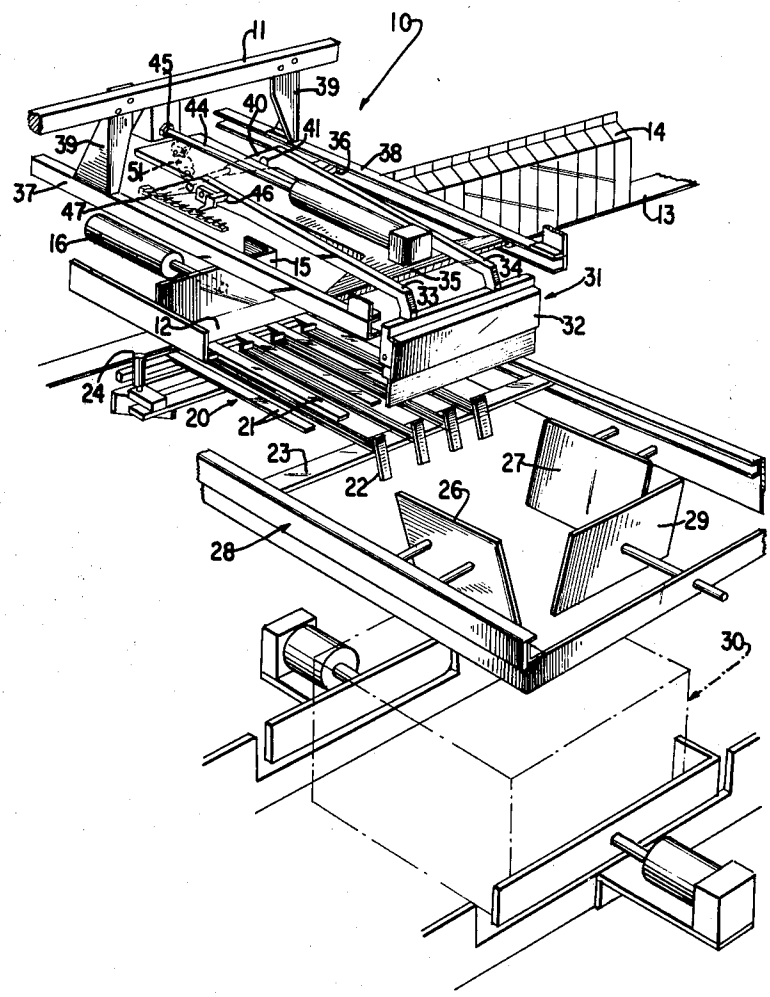


FIG. 1

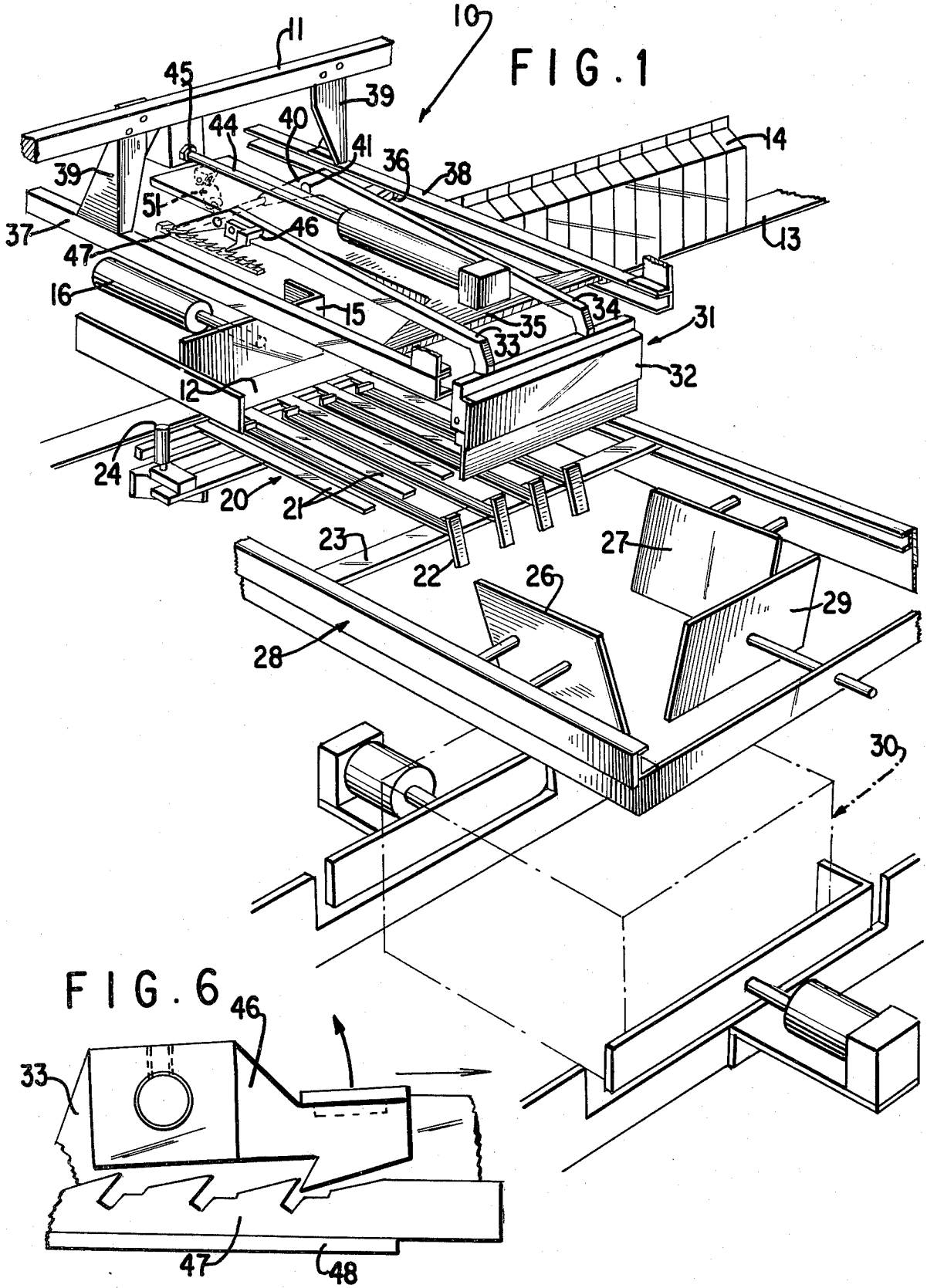

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FIG. 6

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FIG. 2

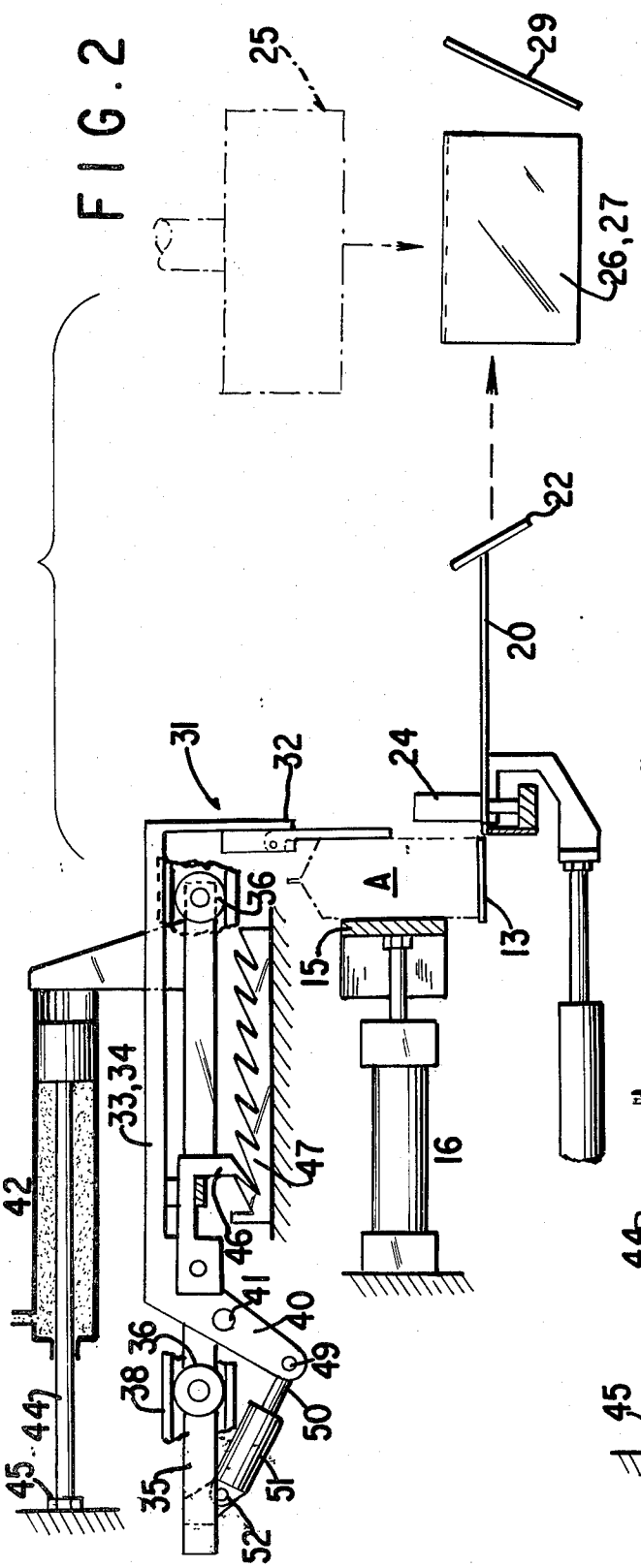
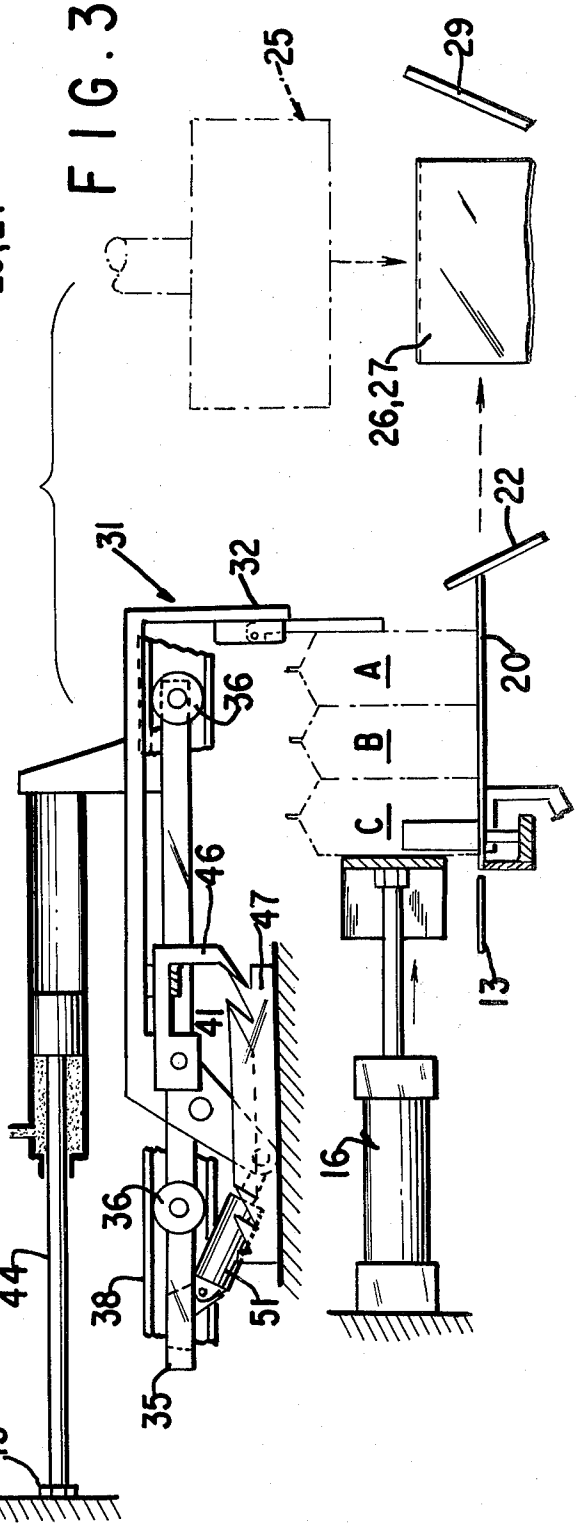

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FIG. 3


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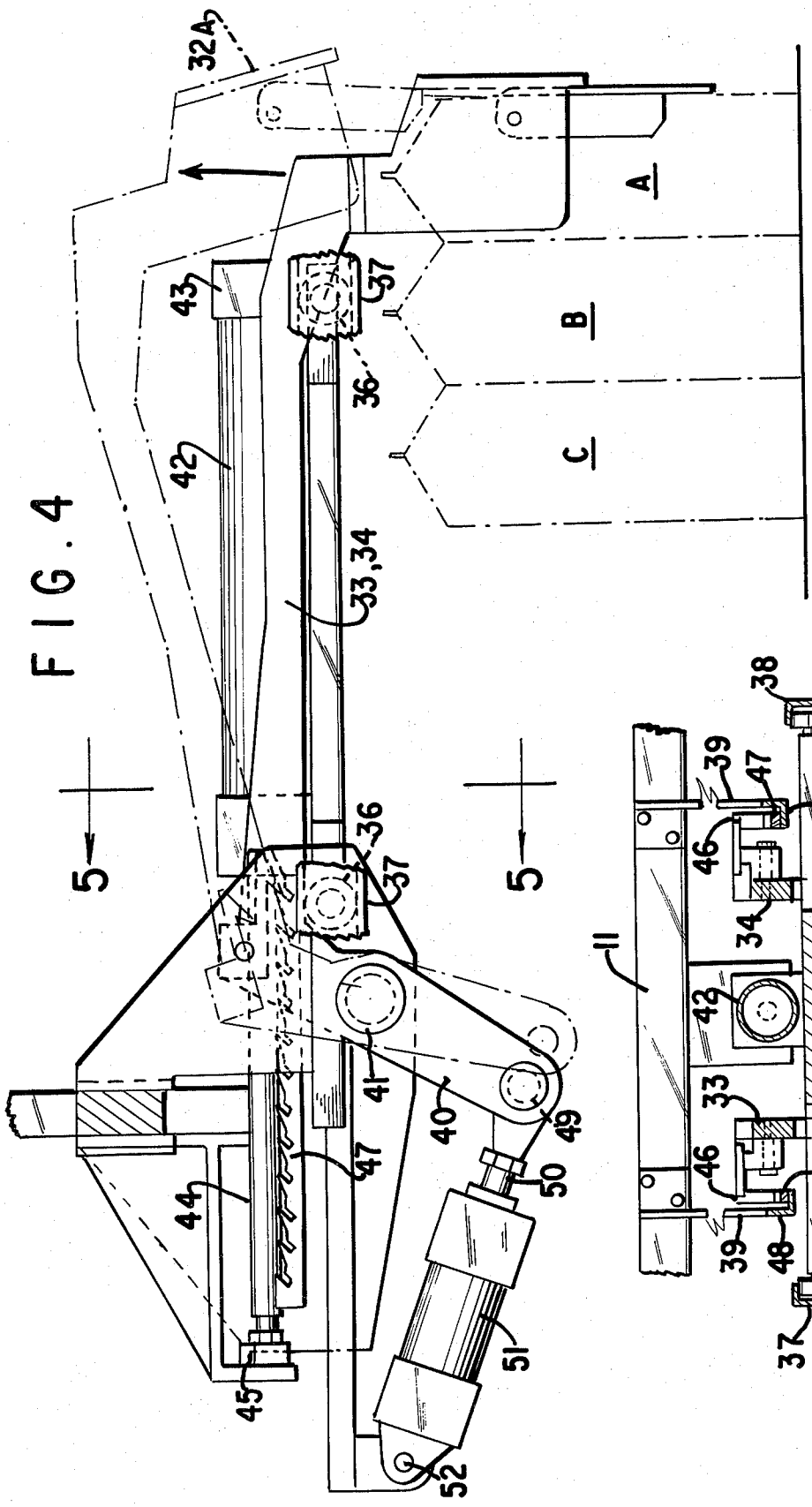

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FIG. 4

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FIG. 5

HIGH SPEED CARTON CASING APPARATUS

The present invention relates to an apparatus for casing cartons, and more particularly, to an apparatus for pushing the cartons to form a tier and to a retaining apparatus for supporting the pushed cartons in an upright position.

A wide variety of products, including dairy products and juices, are packed in containers, such as cartons, which are then moved into a case for shipment. A plurality of these cartons is usually assembled into a tier or layer and then deposited into a case which accommodates this predetermined number of cartons. Generally, each tier or layer may comprise several rows of cartons with each row comprising several cartons. The number of cartons in a tier and the precise arrangement of the cartons within the tier depends largely upon the capacities of the individual cartons and the size of the case in which they are to be shipped.

The apparatus for casing the cartons generally comprises a conveyor along which the cartons are conveyed in a row. A suitable mechanism is then provided for assembling the cartons into a suitable pattern for deposition into a case. Generally, this assembling apparatus comprises a pusher which pushes several cartons transversely from the row of cartons being fed onto a horizontal carrier. After several such pluralities of cartons are pushed onto the carrier, the assembled cartons, which now define a tier, are placed into a case by a suitable gripping mechanism.

It has been found that when the cartons are pushed from the conveyed row onto the horizontal carrier, especially when the pushing is fast, difficulties are encountered in maintaining the cartons in their upright positions. This is especially true when cartons such as half-gallon containers of milk are pushed, since the horizontal pushing movement of the cartons from the row may cause the cartons to fall down. When a carton falls down, it will present a loading problem. Various measures have previously been proposed to maintain the cartons in their upright positions after they have been pushed onto the horizontal carrier. However, such solutions have generally not been satisfactory since they are either too complicated in structure or too unreliable in operation.

One of the objects of the present invention is to provide an improved apparatus for casing cartons.

Another of the objects of the invention is to provide a casing machine wherein the speed of casing can be increased without overturning the cartons being cased.

Another object of the present invention is to provide a casing apparatus having an improved mechanism for pushing and retaining cartons in a layer or tier which is to be positioned in a case.

Another object of the present invention is to provide a mechanism for retaining pushed cartons in their upright position, the mechanism being simple in structure and reliable in operation.

Another object of the present invention is to provide such a retaining mechanism which can be readily retracted from its retaining position when an assembled tier of cartons is to be moved into a case.

In one aspect of the present invention, an apparatus for casing cartons within a case may comprise a loading table onto which a row of containers are fed. A horizontal carrier is disposed adjacent the loading table and a pusher is actuated to push a plurality of cartons from the loading table transversely of said row onto the horizontal carrier. Means are positioned opposite said pusher against which the cartons are pushed to retain the cartons in their upright positions on the horizontal carrier. The retaining means moves horizontally to accommodate additional cartons pushed onto the carrier to define a layer, and the retaining means are then pivoted out of the retaining position when a tier has been completed.

Other objects, advantages and features of the present invention will become apparent from the accompanying description and drawings, which are merely exemplary.

In the drawings:

FIG. **1** is an overall perspective view of that portion of the casing apparatus of the present invention which includes the horizontal carrier, pusher and retaining members;

FIG. **2** is a fragmentary side elevational view of the pusher and retaining bar showing the retaining bar in its original position;

FIG. **3** is a view similar to that of FIG. **2**, but shows the retaining bar in position after a number of cartons have been marshalled into a tier by the pusher;

FIG. **4** is a side elevational view similar to that of FIG. **3** but in greater detail and showing the manner in which the retaining bar is retracted upwardly;

FIG. **5** is a sectional view taken along the lines **5—5** of FIG. **4**; and

FIG. **6** is a side elevational view in enlarged scale showing the disengagement of the ratchet and pawl mechanism illustrated in FIG. **4.**

Proceeding next to the drawings wherein like reference symbols indicate the same parts throughout the various views, a specific embodiment of the present invention will be described in detail.

The casing machine is an improvement over the casing machine disclosed in U.S. Pat. No. **3,273,304** issued Sept. **20, 1966,** and embodies most of the structural features of this machine. It is therefore not necessary to describe each component of the present machine in detail since these components are adequately described in the above-mentioned patent.

As may be seen in FIG. **1,** the casing apparatus of the present invention is indicated generally at **10** and comprises a frame **11** having a loading table **12** which may comprise a portion of a continuous straight line conveyor **13** upon which a row of cartons **14** are conveyed or fed to the caser. In the present embodiment of the invention, cartons **14** comprise half-gallon containers for milk, juice or the like. The function of the present apparatus is not limited to any particular number or size of containers and can be utilized where the cartons are attached in pairs or the individual containers are separate from each other.

Pusher **15** which is actuated by a fluid-operated motor **16** is positioned adjacent the loading table **12** so that the row of cartons conveyed onto the table passes in front of the pusher.

A predetermined number of cartons **14** are pushed from the loading table **12** by pusher **15** onto a horizontally reciprocable carrier **20** which comprises a plurality of spaced bars **21** upon which a tier of cartons is to be supported. The cartons so pushed onto the carrier will form one row of the tier or layer of cartons which will eventually be marshalled on the carrier **20.**

Intermeshing with the horizontal bars **21** are four vertical bars **22** which form a comb and which function to

push the assembled tier of cartons from the carrier **20.** The vertical bars **22** are interconnected by a horizontal bar **23,** the ends of which are attached to hydraulic motor **24** (FIGS. **1,2**) positioned on both sides of the carrier **20** and which move the comb vertically. The comb **22** is in the down position while the cartons are being transferred from the loading table to horizontal carrier **20.** The forward horizontal movement of the comb **22** and the horizontal carrier **20** transfers the tier of cartons to a point beneath a gripping head assembly indicated generally at **25** in FIG. **2.**

The carrier may also comprise opposed plates **26** and **27** which may be actuated by fluid-operated motors and mounted on frame **28.** The tier of cartons is moved against a backup plate **29** which positions the cartons for the gripper head assembly. The clamping plates **26** and **27** and backup plate **29** are positioned as shown in FIG. **1** for depositing a tier of cartons into a case indicated generally at **30.**

Coacting with pusher **15** is a retainer mechanism indicated generally at **31** which comprises a substantially horizontal bar or arm **32** (FIG. **1**) which is positioned parallel to loading table **12** and parallel to the movement of the row of cartons **14** on conveyor **13.**

The bar **32** is mounted on the end of a pair of brackets **33** and **34** which are in turn mounted on a plate **35** provided with a plurality of rollers or wheels **36** which slide in horizontally mounted tracks **37** and **38** supported by brackets **39** from frame **11.**

The inner ends of the arms **33** and **34** are provided with downwardly extending arms **40** which are pivotally mounted at **41** on the frame plate **35.**

A fluid motor means **42** is fixedly attached by a bracket **43** to the mounting plate **35** and has a piston rod **44** fixedly attached at **45.**

Also mounted on the inner ends of the arms **33** and **34** are pawls **46** which are engageable with a ratchet **47** fixed on the casing apparatus as indicated at **48.** The outer ends of the arms **40** are each pivotally connected at **49** to a piston rod **50** of hydraulic motor **51** whose other end is pivotally mounted at **52** on plate **35.**

The pawl **46** and ratchet **47** arrangement will prevent the retaining bar **32** from being moved to the left (FIGS. **2, 3** and **4**) by air tending to expand in cylinder **42** upon completion of a movement of cartons to the right. Such reverse movement would tend to push the cartons in the wrong direction and possibly turning them over.

During the casing operation, a row of cartons **14** is fed by conveyor **13** onto the loading table **12** in front of the pusher **15,** and several cartons are pushed from the loading table onto horizontal carrier **13** to form a row A of a tier or layer of cartons. The cartons of row A are pushed up against the horizontal bar **32** of the retaining mechanism. As the next row of cartons B is pushed from the loading table onto the carrier **20,** the horizontal bar **32** of the retaining mechanism will be pushed to the right, as viewed in the drawing.

When a predetermined number of rows C have been pushed onto the horizontal carrier to form a pattern of cartons, fluid-operated motor **51** is actuated to pivot the bracket arms **33** in a counterclockwise direction around pivot **41** to raise horizontal arm **32** to **32A,** as seen in FIG. **4.** In this position, the horizontal bar is retracted upwardly above the cartons **14** and permits the cartons to be pushed below this bar to clear the retaining mechanism.

In this released or disengaged position of retaining bar **32,** pawl **46** is disengaged from the ratchet **47,** and the fluid-operated motor **42** is actuated to return the retaining mechanism to its original position as shown in FIG. **2.**

The layer or tier of cartons is moved by the horizontal carrier **20** to a position below the gripping mechanism **25** which grips all of the cartons and deposits the cartons in a case **30** positioned therebelow, as can be seen in FIG. **1.**

It is apparent that with this construction the cartons which are pushed from the loading table onto the horizontal carrier are moved up against the horizontal retaining bar **32** so as to be maintained in their upright position even when pushed rapidly. The cartons are retained in these positions even after additional rows of cartons are pushed onto the carrier to form a layer of cartons. The retaining bar is then readily disengaged from the cartons to permit the cartons to pass underneath the bar, and the retaining bar is returned to its original position against which the first row of a succeeding tier of cartons is positioned.

It will be understood that various details of construction and arrangement of parts may be changed without departing from the spirit of the invention except as defined in the appended claims.

What is claimed is:

1. In an apparatus for casing cartons within a case including a loading table onto which a row of cartons are fed, a reciprocable horizontal carrier adjacent thereto for receiving rows of cartons from said loading table, a pusher adjacent said loading table and means for reciprocating said pusher to push a plurality of cartons in a row from said loading table transversely of said row and onto said horizontal carrier, means adjacent said carrier for placing cartons into a case and means supporting said case to be filled, the improvement comprising retaining means on the opposite side of the row of cartons being pushed onto said carrier, said retaining means having means connected thereto to oppose the force exerted by said pusher against said cartons as the cartons are pushed so as to retain said cartons in their upright position on the horizontal carrier, and means for disengaging said retaining means from said cartons by moving said retaining means upwardly and away from said cartons when a predetermined number of cartons have been pushed upon said horizontal carrier, so that said carrier can then move the marshalled cartons to a further position preparatory to casing.

2. In an apparatus as claimed in claim **1** wherein said disengaging means comprises means for pivoting said retaining means upwardly about a horizontal axis.

3. In an apparatus as claimed in claim **1** wherein said retaining means comprises a horizontal arm substantially parallel to said row of cartons, bracket means supporting said horizontal arm and mounted for horizontal movement transversely of said row, and means operatively connected to said bracket means for pivoting said bracket means and said arm upwardly to disengage said cartons.

4. In an apparatus as claimed in claim **3** and comprising stationary ratchet means, pawl means on said bracket means for engaging with said ratched means to position said retaining means during its horizontal movement with cartons pushed thereagainst, the pivoting of said bracket means also disengaging said pawl and ratchet means to permit said horizontal arm to return to its original position adjacent loading table.

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