May 24, 1955 G. H. COX ET AL 2,709,029

PACKAGING MACHINE FOR CARTONS

Filed Nov. 12, 1952 4 Sheets-Sheet 1

Fig. 1

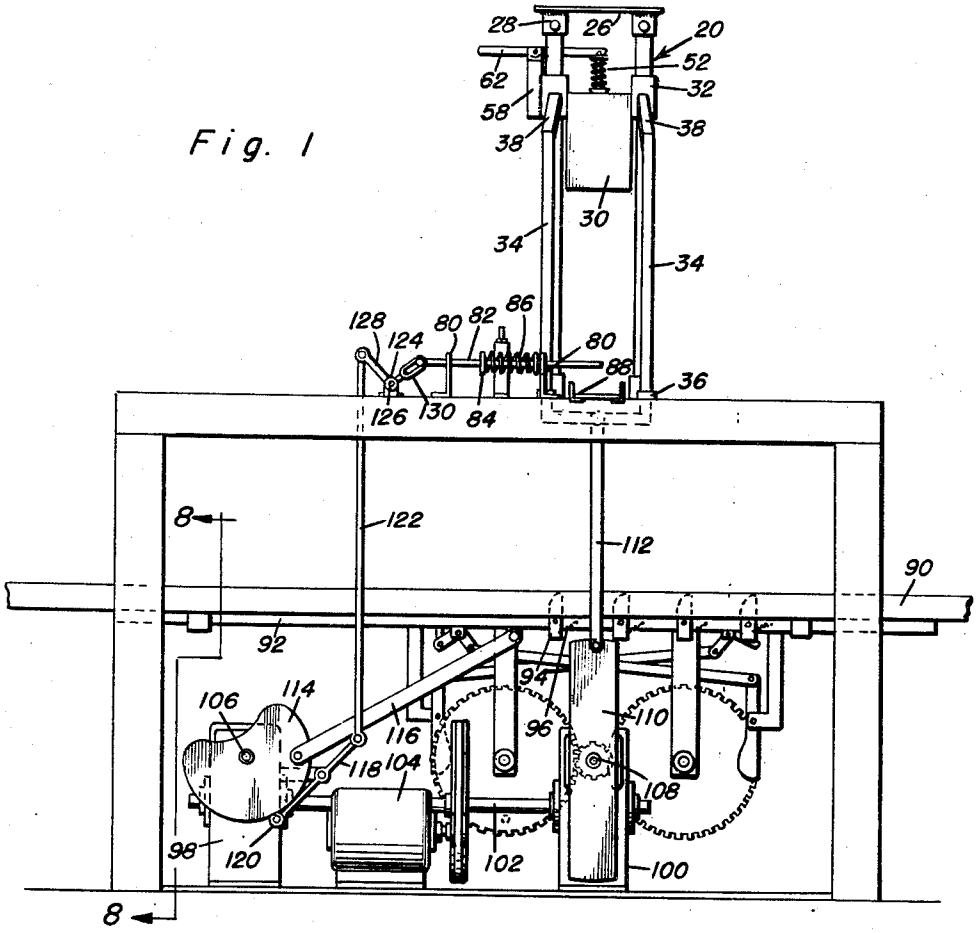
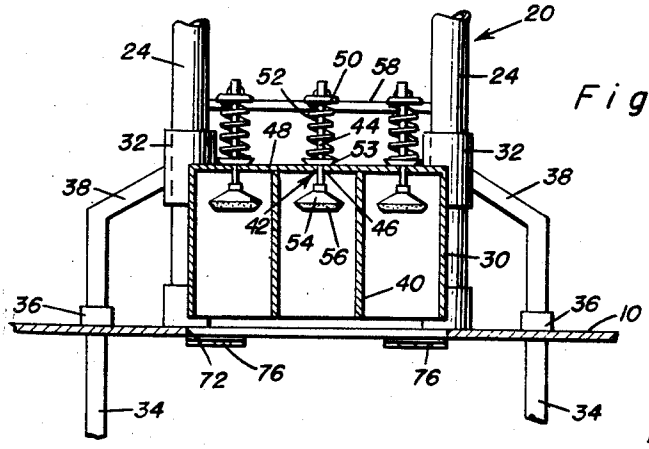


Fig. 7



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Fig. 2

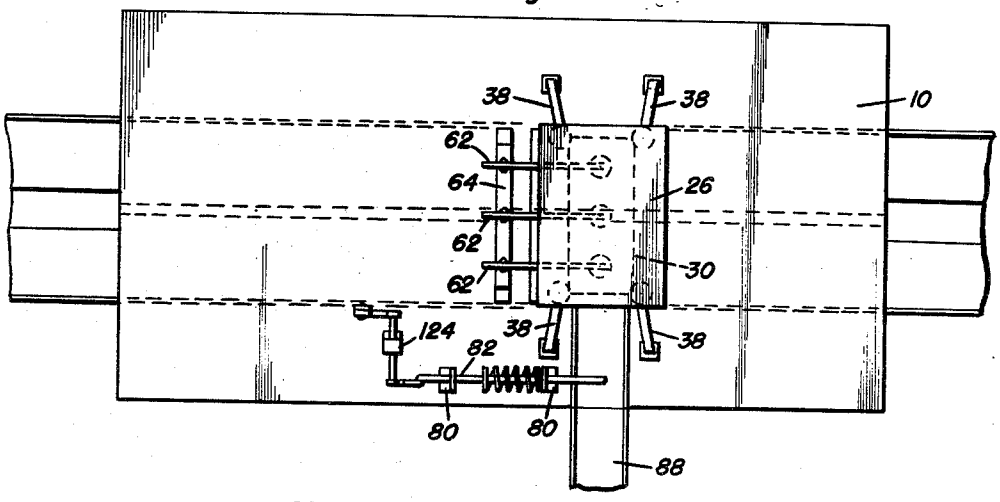


Fig. 3

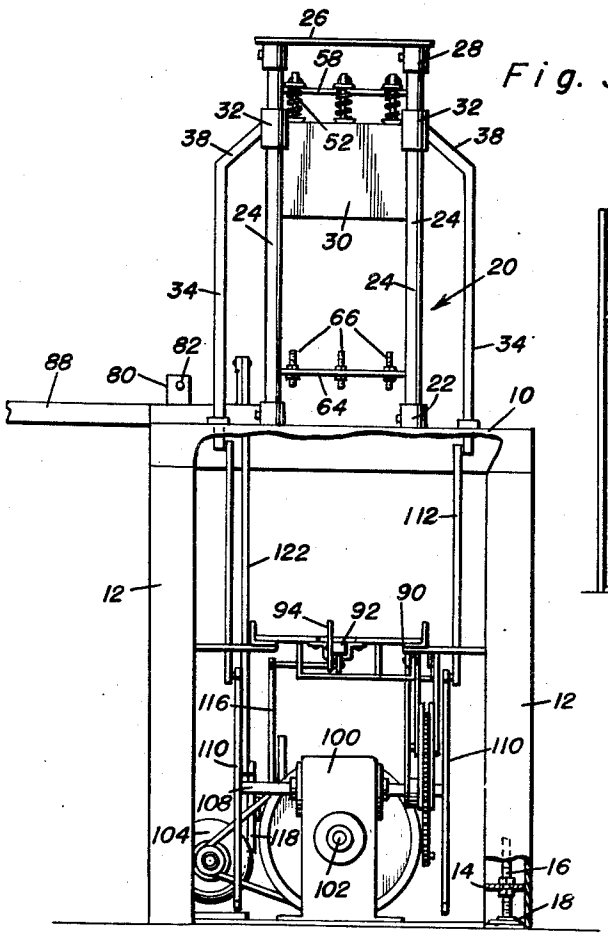
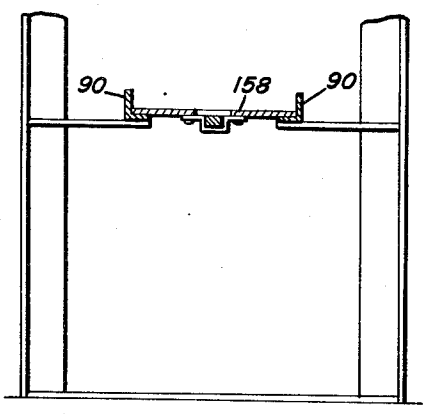


Fig. 8



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PACKAGING MACHINE FOR CARTONS

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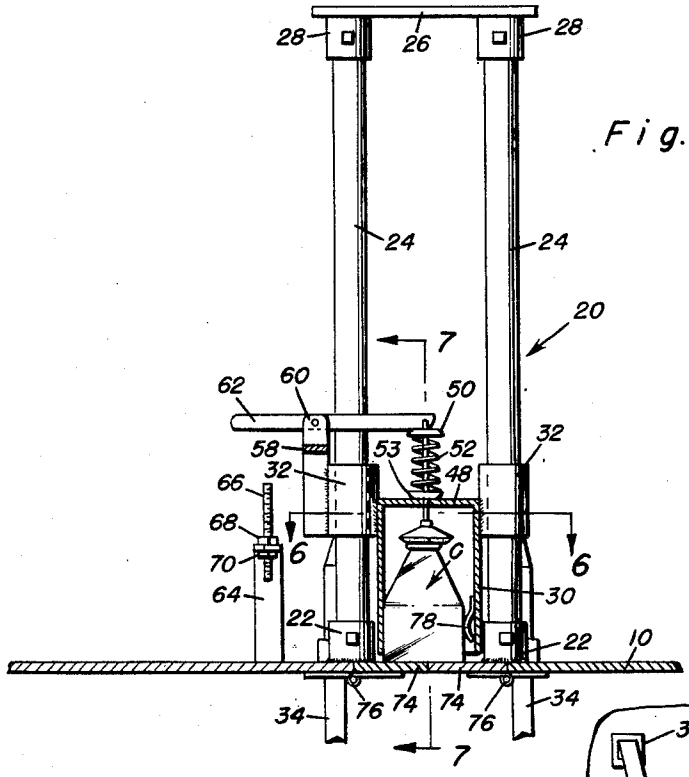


Fig. 4

Fig. 5

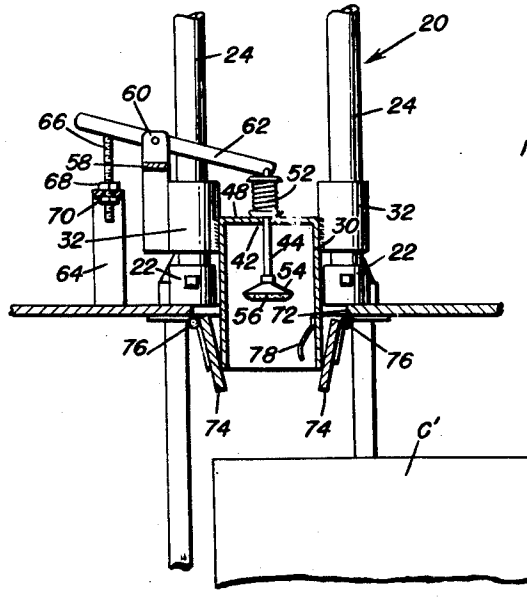
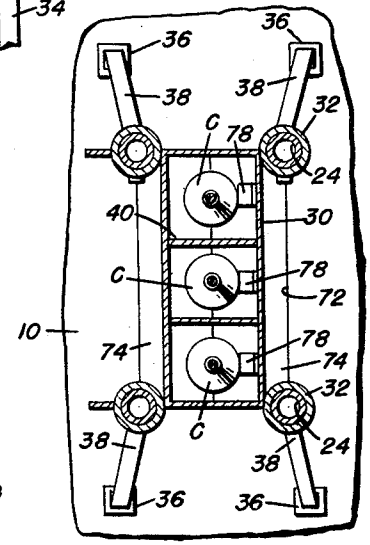


Fig. 6



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Fig. 9

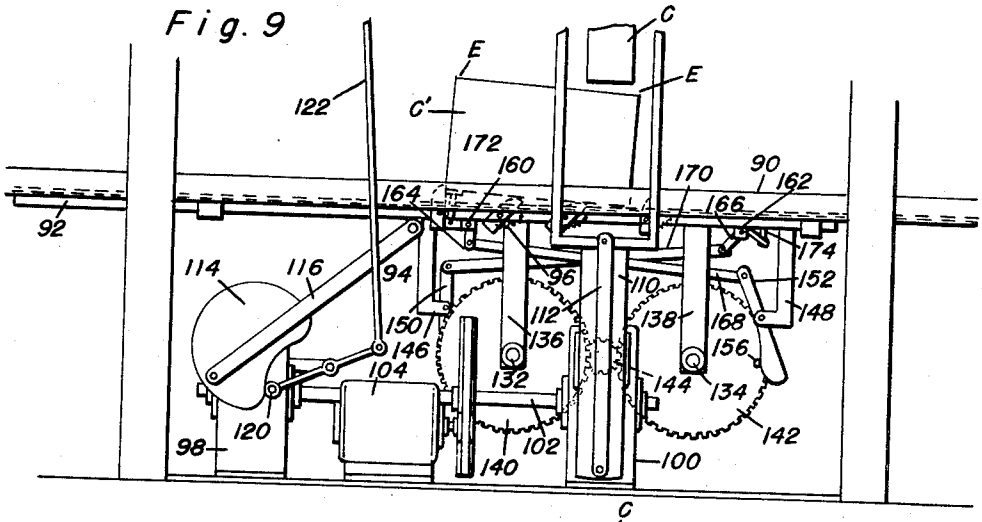


Fig. 10

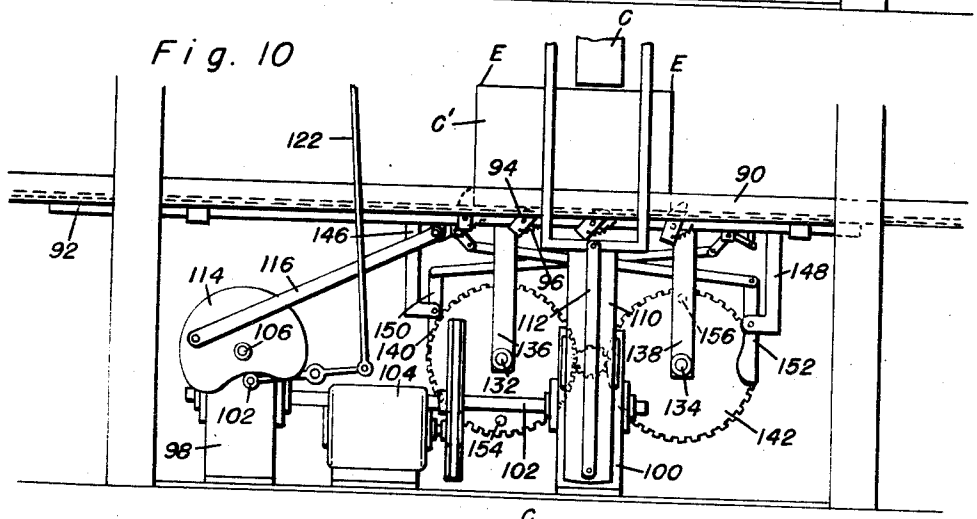
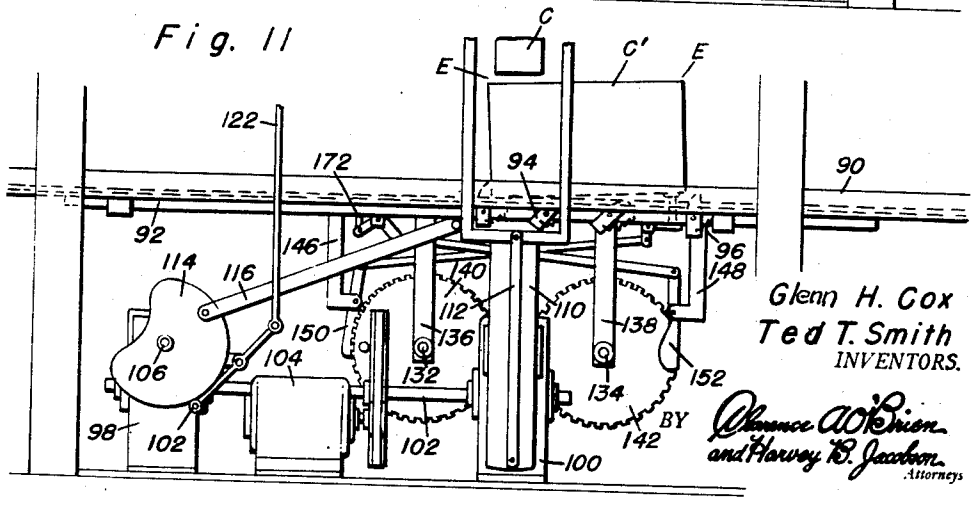


Fig. 11



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United States Patent Office

2,709,029

Patented May 24, 1955

2,709,029

PACKAGING MACHINE FOR CARTONS

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Application November 12, 1952, Serial No. 319,911

12 Claims. (Cl. 226—14)

This invention relates to new and useful improvements in article handling apparatus and the primary object of the present invention is to provide a machine for packaging cartons.

An important object of the present invention is to provide a carton packaging machine involving a carton conveyor that will move cartons in a step by step manner beneath a carrier, which carrier includes a container ejecting means that will be actuated as the carrier is lowered to eject containers into a carton disposed therebeneath.

Yet another object of the present invention is to provide a carton packaging machine including novel and improved carrier means that will be slipped over a group of containers and be lowered toward a carton so that the ejecting means of the carrier may be actuated to force containers in the carrier into a carton that is disposed thereunder.

A further object of the present invention is to provide a packaging machine for cartons and the like involving a compact powered unit that is operatively connected to a carrier raising and lowering mechanism, a carton conveying means, and a stop member that will limit the number of containers being moved under the carrier.

A still further aim of the present invention is to provide a packaging machine for cartons including a vertically reciprocating carrier having a plurality of open bottomed compartments and means slidably received within the compartments for ejecting containers therefrom as the carrier is lowered by a power means.

Other objects and advantages reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming part hereof, wherein like numerals refer to like parts throughout, in which:

Figure 1 is a front elevational view of the present invention and illustrating the carrier in its raised position;

Figure 2 is a top plan view of Figure 1;

Figure 3 is an end view of Figure 1;

Figure 4 is an enlarged fragmentary view of Figure 1, with parts broken away and shown in section for the convenience of explanation, and showing the carrier in its lowered position prior to the opening of the drop door sections;

Figure 5 is a view similar to Figure 4 but showing the carrier in its completed lowered position and the container ejected from the carrier;

Figure 6 is a horizontal sectional view taken substantially on the plane of section 6—6 of Figure 4;

Figure 7 is a vertical sectional view taken substantially on the plane of section line 7—7 of Figure 4;

Figure 8 is a transverse vertical sectional view taken substantially on the plane of section line 8—8 of Figure 1;

Figure 9 is a fragmentary view of Figure 1 showing a carton tilted to receive a first row of containers;

Figure 10 is a view similar to Figure 9 but showing the carton receiving an intermediate row of containers;

Figure 11 is a view similar to Figures 9 and 10 but showing the carton tilted to receive a final row of containers.

Referring now to the drawings in detail, wherein for the purpose of illustration, there is disclosed a preferred embodiment of the present invention, the numeral 10 represents a table top or platform having supporting legs 12. The legs 12 are preferably of channel construction and plates 14 welded to the lower end portions of the legs 12 vertically adjustably support rods 16 having pressure feet 18 swivelled to their lower ends, whereby the table top may be maintained in a substantially horizontal or level position.

A combined guide and support 20 is mounted on the table top 10 and comprises vertical sockets 22 that are suitably fixedly secured to the upper face of the table top 10. The sockets 22 accommodate the lower ends of vertical guide rods or posts 24 and the lower ends of these rods are suitably held within the sockets 22 by set screws or the like. A plate 26 extends over the upper ends of the rods 24 and has depending sleeves 28 fixed thereto, which sleeves are telescoped over the upper ends of the rods 24. Set screws or the like retain the upper ends of the rods 24 within the sleeves 28.

A substantially rectangular carrier 30 is vertically slidably supported by the combined guide and support 20. Sleeves 32 are fixed to the upper corners of the carrier 30 and are disposed about the rods 24 to slide thereon. Guide arms 34 are slidably received in vertical guide rings 36 fixed to the table top and include upper angulated ends 38 that are fixed by welding or the like to the outer peripheries of the sleeves 32.

Carrier 30 includes a plurality of open bottom vertical compartments 40 that slidably receive vertically disposed ejector plungers 42. The shanks 44 of the plungers 42 extend upwardly through apertures 46 in the upper wall 48 of the carrier 30 and support abutment disks 50. Coil springs 52 embrace the upper end portions of the shanks 44 and are biased between the abutment disks 50 and wear plates 53, resting upon the wall 48, to yieldingly urge the plungers raised in the compartments with the heads 54 of the plungers at the upper ends of the compartments. Resilient strips or pads 56 are fixed to the heads of the plungers to form a soft pressure surface.

The parallel vertical limbs of an inverted U-shaped support bracket 58 are fixed by welding or the like to a forward and rear pair of sleeves 32. Ears 60 extend upwardly from the horizontal web portion of bracket 58 and are pivotally attached to intermediate portions of a group of spaced parallel rock levers 62. The inner ends of the levers 62 extend over the carrier 30 and are apertured to receive the angulated upper ends of the shanks 44, whereby the plungers may be moved downwardly through the compartments 40 as the inner ends of the levers 62 are lowered toward the wall 48.

An inverted U-shaped support member 64 is fixed to the table top 10 and its horizontal web portion is provided with longitudinally spaced apertures that receive threaded stop rods 66. Upper and lower clamp nuts 68 and 70 are threaded on the rods 66 and clampingly engage the web portion of member 64 to retain the stop rods 66 vertically adjusted on the support member 64. The rods 66 are disposed in the path of the outer ends of the lever 62, so that as the carrier 30 is lowered, the outer ends of the lever 62 will engage the rods 66, whereupon the inner ends of the lever 62 will be moved downwardly toward the wall 48 causing movement of the plungers 42 downwardly through the compartment 40.

The table top 10 is formed with an opening 72 through which the carrier may be moved. A pair of oppositely swinging drop door sections 74 are hinged to the under-

surface of the top 10 by spring hinges 76, the latter retaining the door sections 74 normally within the opening 72.

A spring finger 78 is secured within each of the compartments 40 and will retain containers C against the walls of the compartments until the plungers 42 are moved downwardly through the compartments. The fingers 78 will come into resilient engagement with the containers C as the carrier 30 is lowered over a group of containers supported upon the door sections 74.

Means are provided for limiting the number of containers that are moved across the table top and onto the door sections 74. This means includes a pair of guide brackets 80 that are fixed to the upper surface of the top 10 and which slidably support a horizontally disposed stop rod 82. An abutment 84 is fixed to the rod 82 and is engaged by one end of a coil spring 86 that embraces the rod 82. The other end of the spring 86 abuts one of the brackets 80 to yieldingly urge the rod 82 to a retracted position clear of blocking container C as they are moved on to the door sections 74 along a guide chute 88 whose discharge end extends to the table top.

A pair of spaced parallel horizontal carton receiving angle rails 90 are suitably supported under the table top 10. A horizontally moving bar 92 is disposed between and parallels the rods 90. The ends of the bar 92 are slidably supported by suitable bearings (not shown). Cam surfaced fingers 94 are pivotally attached to the bar 92 at longitudinally spaced points. Springs 96 connect the lower ends of the fingers 94 to the bar 92 to yieldingly urge the fingers 94 to a vertical position.

A pair of similar gear box units 98 and 100 are supported under the top 10 in side by side relation. The coaxially arranged drive shafts 102 of the units 98 and 100 are coupled together and to the drive shaft of a motor 104 by suitable means, whereby the driven shafts 106 and 108 of the units 98 and 100 will be rotated in unison.

Elongated, spaced parallel plate members 110 are centrally fixed to the ends of the shaft 108. The plate members 110 are connected at one of their ends to a pair of the arms 34 by pitman 112 so that as the plate members 110 rotate, the carrier 30 will be reciprocated.

The shaft 106 fixedly supports a cam 114 that is eccentrically pivoted to one end of an actuating link 116. The other end of the link 116 is pivoted to the bar 92, whereby the bar 92 will be horizontally reciprocated during rotation of cam 114. Cam 114 also functions to impart oscillatory motion to a rocker arm 118 that is pivotally supported by a unit 98 since the peripheral edge of cam 114 rides against a roller 120 at the lower end of arm 118.

The upper end of arm 118 is pivoted to a pitman 122 that extends upwardly through a slot in table top 10. A bearing 124 mounted on the top 10 rotatably supports a horizontal rod 126 having laterally projecting arms 128 and 130 fixed to its ends. Arm 128 is pivoted to the upper end of pitman 122 and arm 130 is slidably pivotally attached to the angulated end of stop rod 82.

In practical use of the present invention, the carrier 30 is initially raised and rod 82 is retracted so that containers C may move downwardly on chute 88 to extend under the carrier 30. As the carrier 30 is lowered, cam 114 will engage roller 120 to move pitman 122 and cause rod 82 to be extended over the chute 88, thereby preventing containers from passing under the carrier 30 as the latter is being lowered.

During downward movement of the carrier 30, the containers C will be received within the opened lower ends of the compartments 40 and the containers will be held within the compartments 40 by the spring arms 78 as shown best in Figure 4 of the drawings. Continued downward movement of the carrier 30 will force the containers against the door sections 74 in order that the latter may swing to an open position as illustrated in Figure 5. As the carrier passes through the opening 72, the outer ends of the levers 62 will engage the abutment rods 66 to effect a lowering of the plungers 42 and these plungers will eject the containers C from the compartments 40 and into a carton C' located under the opening 72.

As illustrated in the drawings, the cartons C' are of such a size as to receive three of the containers C. Therefore, each time the bar 92 is moved leftward it will bring an unfilled carton directly under the opening 72. The dogs 94 will ratchet past the cartons during reverse sliding movement of the bar 92 and permit these fingers to be engaged with successive cartons.

The rod 82 will be held across the chute 88 until the carrier 30 is in its raised position after the rod 82 will be retracted to permit an additional group of containers to pass on to the raised door sections 72.

The cartons C' are frequently provided with end ears E which will interfere with the rows of containers C inserted into the ends of the carton if the carton remains flat and horizontal. Accordingly, means are provided for tilting the carton as the end rows of containers are loaded therein. This means consists of a pair of spaced parallel horizontally disposed shafts 132 and 134 that are rotatably supported in bearings at the lower ends of hanger straps 136 and 138 depending from the rails 90.

The shafts 132 and 134 fixedly support relatively large gears 140 and 142 whose teeth mesh with a drive gear 144 fixed on shaft 108 whereby the shafts 132 and 134 will rotate with the shaft 108.

Additional hanger brackets 146 and 148 depend from rails 90 and pivotally support vertically swingable links 150 and 152 having cam surfaced lower ends for engagement by eccentric pins 154 and 156 fixed to gears 140 and 142, whereby the links 150 and 152 will be oscillated during rotation of the gears 140 and 142.

The bottom guide wall 158 for the cartons C', supported on the rails 90, has channel brackets 160 and 162 fixed to its undersurface. The brackets 160 and 162 pivotally support bellcranks 164 and 166. The lower leg of bellcrank 164 is connected to the upper end of link 152 by a pitman 168 and the lower leg of bellcrank 166 is connected to the upper end of link 150 by a pitman 170.

Rear and forward vertically slidable tilt fingers 172 and 174 are received in apertures provided in the bottom wall 158. The forward finger 172 is pivoted to the upper leg of bellcrank 164 and the rear finger 174 is pivoted to the upper leg of bellcrank 166.

As the carton C' is advanced by the lugs 94, with its forward end disposed under the trap door sections 74, pin 156 rides against the lower end of link 152 to move pitman 168 rearwardly, thereby raising finger 172 and as finger 172 is located under the rear end of the carton, the carton will be lifted or tilted as shown in Figure 9. The rear end of the carton will remain raised as shown in Figure 9 until the first row of containers are lowered into the forward end of the carton, then pin 156 clears links 152 and the carton remains horizontal as it is moved forwardly to receive the second and third rows of containers as shown in Figure 10.

As the lugs 94 move the carton C' forwardly so that the rear end of the carton is positioned to receive the final row of containers, pin 154 on gear 140 rides against the lower end of link 150 to move the pitman 170 forwardly. As the pitman 170 moves forwardly, bellcrank 166 will be rocked to raise finger 174, and as the forward end of the carton C' is now over finger 174 it will be raised, as shown in Figure 11, so that the last row of containers may enter the rear end of the carton.

The carriage lowering mechanism, carton advancing mechanism and carton tilting mechanism are operatively connected together in timed relation so that the carton will be advanced in a step by step manner with the car-

riage being lowered after the carton has been moved a distance equal to the width of one row of containers. As the ends of the carton are moved under the row being lowered by the carriage, the carton will be tilted so that the row of containers being dropped into the carton will clear the ears E of the carton.

Having described the invention, what is claimed as new is:

1. A packaging machine for containers, said machine comprising a table top having drop door sections, a combined guide and support secured to and extending upwardly from the table top, a carrier vertically slidably mounted on said combined guide and support and disposed over the door sections, said carrier including a plurality of compartments that are open at their lower ends, a plunger slidably received in the upper end of each compartment, operating means for the plungers to move the plungers downwardly through the compartments, means operatively connected to the carrier for sequentially lowering and raising the carrier, and means on the table top for engaging and actuating said operating means as the carrier is lowered to force containers in the compartments downwardly past the door sections.

2. A packaging machine for containers, said machine comprising a table top having drop door sections, a combined guide and support secured to and extending upwardly from the table top, a carrier vertically slidably mounted on said combined guide and support and disposed over the door sections, said carrier including a plurality of compartments open at their lower ends, a plunger slidably received in the upper end of each compartment, spring means engaging the plungers and yieldingly retaining the same raised in the compartments, rock levers pivotally supported on the carrier and engaged with the plungers for lowering the plungers in the compartments, and means on the table top engageable with the levers during lowering of the carrier for actuating the levers to their plunger lowering position whereby containers in the compartments will be ejected therefrom and past the door sections.

3. The combination of claim 2 wherein said last-named means comprises an inverted U-shaped support member secured to the table top and having a web portion paralleling the table top and provided with spaced apertures, threaded abutment pins secured in said apertures and extending upwardly from said web portion to be engaged by said levers.

4. A packaging machine for containers, said machine comprising a table top having drop door sections, a combined guide and support secured to and extending upwardly from the table top, a carrier vertically slidably mounted on said combined guide and support and disposed over the door sections, said carrier including a plurality of compartments that are open at their lower ends, a plunger slidably received in the upper end of each compartment, spring means engaging the plungers and yieldingly retaining the same raised in the compartments, rock levers pivotally supported on the carrier and engaged with the plungers for lowering the plungers in the compartments, and means on the table top engageable with the levers during lowering of the carrier for actuating the levers to their plunger lowering position whereby containers in the compartments will be ejected therefrom and past the door sections, and power operated means connected to said carrier for sequentially lowering and raising the carrier.

5. A packaging machine for containers, said machine comprising a table top having drop door sections, a combined guide and support secured to and extending upwardly from the table top, a carrier vertically slidably mounted on said combined guide and support and disposed over the door sections, said carrier including a plurality of compartments that are open at their lower ends, a plunger slidably received in the upper end of each compartment, spring means engaging the plungers and yieldingly retaining the same raised in the compartments, rock levers pivotally supported on the carrier and engaged with the plungers for lowering the plungers in the compartments, and means on the table top engageable with the levers during lowering of the carrier for actuating the levers to their plunger lowering position whereby containers in the compartments will be ejected therefrom and past the door sections, and a horizontally slidable stop element on the table top in front of said combined guide and support to limit the number of containers that will be disposed under the carrier.

6. The combination of claim 5 and power actuated means connected to the stop element for retracting the stop element as the carrier is raised and for releasing the stop element after the carrier has been raised.

7. A packaging machine for containers, said machine comprising a table top having drop door sections, a combined guide and support secured to and extending upwardly from the table top, a carrier vertically slidably mounted on said combined guide and support and disposed over the door sections, said carrier including a plurality of compartments that are open at their lower ends, a plunger slidably received in the upper end of each compartment, spring means engaging the plungers and yieldingly retaining the same raised in the compartments, rock levers pivotally supported on the carrier and engaged with the plungers for lowering the plungers in the compartments, and means on the table top engageable with the levers during lowering of the carrier for actuating the levers to their plunger lowering position whereby containers in the compartments will be ejected therefrom and past the door sections, and a carton conveyor under the table top for moving cartons under the door sections in a step by step manner.

8. A packaging machine for cartons, said machine comprising a table top having an opening therein and a pair of oppositely swinging door sections on its undersurface normally closing the opening, a combined guide and support secured to and extending upwardly from the table top, a carrier vertically slidably supported on the combined guide and support and overlying the opening, said carrier having at least one open bottom vertical compartment, an ejector plunger slidably carried by said carrier and movable through said compartment, means engaging the plunger and urging the same raised within the compartment, means attached to the plunger for moving the same downwardly through the compartment, and means supported on the table top for actuating said plunger moving means as the carrier is lowered relative to the table top, whereby a container in the compartment will be ejected therefrom and through the opening.

9. A packaging machine for cartons, said machine comprising a table top having an opening therein and a pair of oppositely swinging door sections on its undersurface normally closing the opening, a combined guide and support secured to and extending upwardly from the table top, a carrier vertically slidably supported on the combined guide and support and overlying the opening, said carrier having at least one open bottom vertical compartment, an ejector plunger slidably carried by said carrier and movable through said compartment, means engaging the plunger and urging the same raised within the compartment, means attached to the plunger for moving the same downwardly through the compartment, and means supported on the table top for actuating said plunger moving means as the carrier is lowered relative to the table top, whereby a container in the compartment will be ejected therefrom and through the opening, said plunger including a padded head for pressing against a container in said compartment.

10. A packaging machine for cartons, said machine comprising a table top having an opening therein and a pair of oppositely swinging door sections on its undersurface normally closing the opening, a combined guide and support secured to and extending upwardly from the

table top, a carrier vertically slidably supported on the combined guide and support and overlying the opening, said carrier having at least one open bottom vertical compartment, an ejector plunger slidably carried by said carrier and movable through said compartment, means engaging the plunger and urging the same raised within the compartment, means attached to the plunger for moving the same downwardly through the compartment, and means supported on the table top for actuating said plunger moving means as the carrier is lowered relative to the table top, whereby a container in the compartment will be ejected therefrom and through the opening, and a spring finger in said compartment for yieldingly retaining a container within the compartment until the plunger is moved downwardly within the compartment.

11. A packaging machine for containers, said machine comprising a table top having drop door sections, a combined guide and support secured to and extending upwardly from the table top, a carrier vertically slidably mounted on said combined guide and support and disposed over the door sections, said carrier including a plurality of compartments that are open at their lower ends, a plunger slidably received in the upper end of each compartment, operating means for the plungers to move the plungers downwardly through the compartments, means operatively connected to the carrier for sequentially lowering and raising the carrier, and means on the table top for engaging and actuating said operating means as the carrier is lowered to force containers in the compartments downwardly past the door sections, and means supported on the machine for tilting the end of a carton under the carrier as a row of containers is lowered into the carton.

12. The combination of claim 11, wherein said tilting means includes forward and rear vertically slidable tilt fingers, and means operatively connected to the fingers for sequentially moving the fingers upwardly.

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