

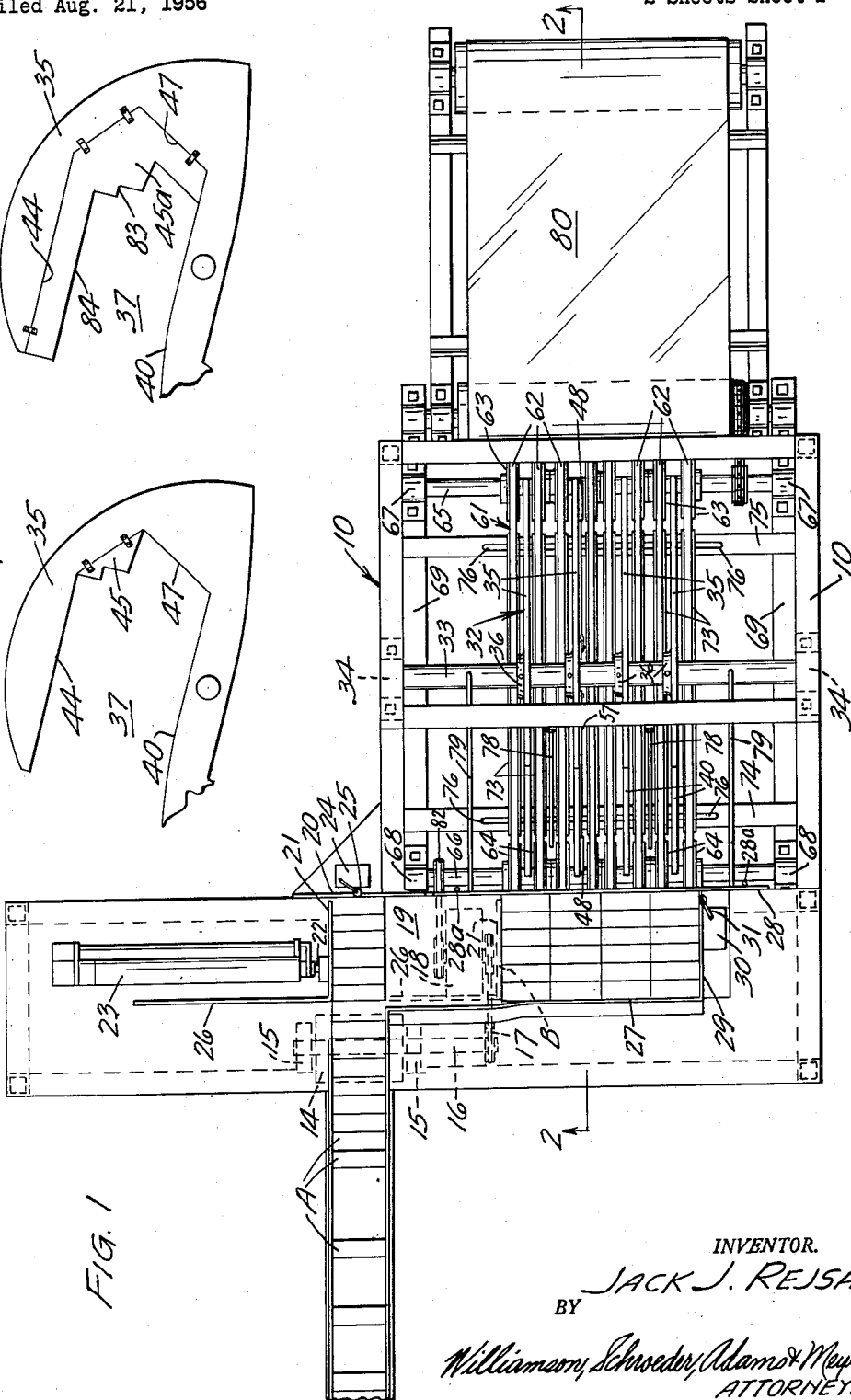
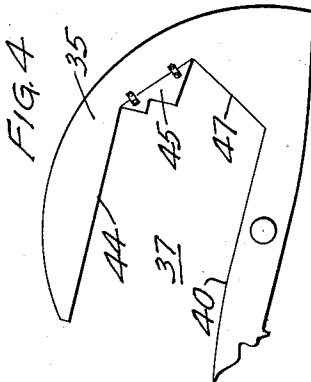
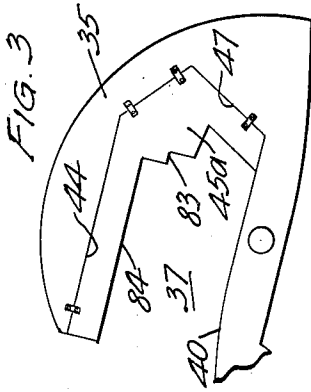
May 6, 1958

J. J. REJSA
PACKING MACHINE

2,833,099

Filed Aug. 21, 1956

2 Sheets-Sheet 1



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J. J. REJSA
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2 Sheets-Sheet 2

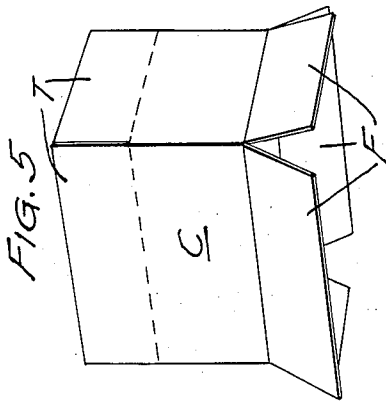
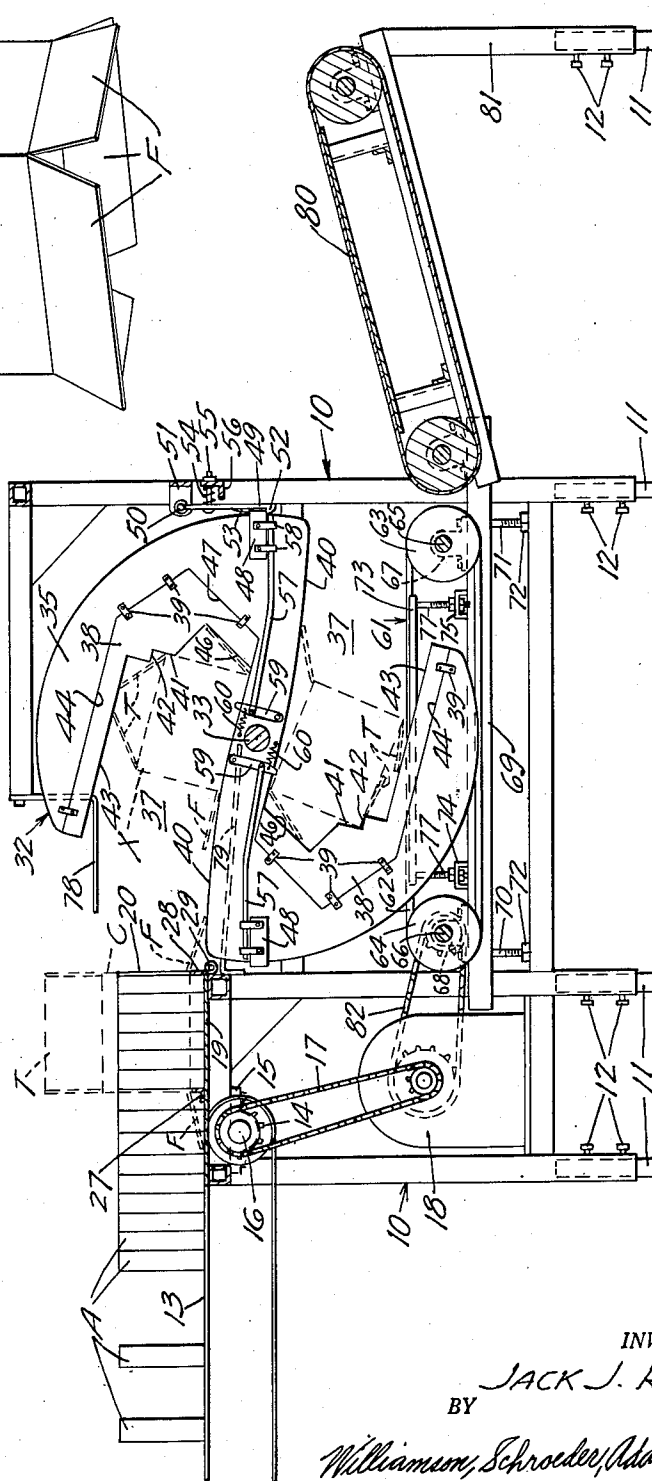


FIG. 2



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2,833,099

PACKING MACHINE

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17 Claims. (Cl. 53—243)

This invention relates to article packing machinery and more specifically relates to a machine for packing a plurality of articles such as packages or boxes into a carton or case.

The carton blanks are frequently supplied by the carton manufacturer in a substantially tubular, but flattened, form, wherein the flaps which are to form the carton top and bottom extend endwise outwardly of the blank. For the user of the carton, there are many problems involved in forming the cartons and then conveying the open-topped cartons to the location at which the cartons are to be packed. Obviously if the cartons are to be packed at a relatively high rate of speed the cartons must either be conveyed to that location at a high rate of speed, or there must be storage facilities for cartons at the location of packing.

It is to the elimination of these and other disadvantages in forming cartons from blanks and in packing the cartons that my invention is directed along with the inclusion in the invention of other novel and desirable features.

An object of my invention is to provide a new and improved case-packing machine of simple and inexpensive construction and operation which very substantially reduces the time and labor used in packing a plurality of articles in a carton.

Another object of my invention is to provide novel apparatus to facilitate loading of a carton as the carton is being formed and before any of the carton flaps have been folded inwardly.

Still another object of my invention is to provide a novel and improved machine for receiving and supporting a plurality of articles in an open-bottomed carton and for folding the top flaps of the carton inwardly and then inverting the carton to cause the articles to be supported on the top flaps and thereby facilitate further handling and sealing of the top and bottom of the packed carton.

A further object of my invention is the provision of an improved machine for receiving and supporting a plurality of articles in an open-bottomed carton and for folding the top flaps of the carton inwardly and inverting the carton onto a conveyor whereupon the articles are supported in the carton on the inwardly folded flaps thereof and the carton is immediately carried away.

A still further object of my invention is to provide a carton loader which facilitates the use of cartons having both top and bottom open and which is readily adapted for use with cartons of different sizes and for use in applications wherein the number of articles to be carried in the cartons is to be changed.

Still another object of my invention is to provide a new and improved method of loading a plurality of articles into a carton blank, consisting in outwardly flaring the lower carton flaps and moving the carton downwardly onto the articles whereby to cause the articles to be funneled by the outwardly flared flaps into the carton, and then inverting the articles and carton to support the articles in the carton.

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These and other objects and advantages of my invention will more fully appear from the following description made in connection with the accompanying drawings wherein like reference characters refer to the same parts throughout the several views and in which:

Fig. 1 is a top plan view of the invention;

Fig. 2 is a longitudinal vertical section view of the invention taken substantially on a plane as indicated at 2—2 in Fig. 1;

Fig. 3 is a detail view showing an insert element applied in the carrier to adapt the machine for handling cartons of different sizes;

Fig. 4 is a detail view of still another insert applied in the carrier to adapt the machine for handling cartons of still another size; and

Fig. 5 is a perspective view of a carton blank prepared for receiving the rows of articles through the bottom thereof.

One form of the invention is shown in the drawings with slight modifications and is described herein.

The machine comprising the present invention is provided with a supporting structure or frame which is indicated in general by the numeral 10. The supporting structure 10 is provided with vertically adjustable supporting legs 11 which are secured in the desired positions by means of the bolts 12.

Means are provided for collecting or accumulating articles A, which in the form shown comprise boxes for carrying cake mixes and the like, in rows containing six such articles and for collecting the rows of articles in side-by-side relation with each other until a sufficient number of rows of articles are collected to fill a carton or case. Frequently cases of articles such as boxes will contain twenty-four such articles, four rows of articles and each row containing six such articles. It should be understood that the number of articles per row might well be changed as the number of rows. In the form shown, such means comprise an article conveyor 13 which, in the form shown, includes an endless belt trained over a pulley 14 which is journaled in suitable bearings 15 at one end of the supporting structure 10. The shaft 16 of pulley 14 is connected by means of a chain and sprocket drive connection 17 which may include a variable speed pulley, to a source of rotary power or motor 18. The upper surface of the conveyor 13 lies substantially in the plane of an article support or plate 19 whereby the articles A will be pushed onto the top surface of the plate 19 by the conveyor and other articles travelling therealong. A stop element 20 extends upwardly from the plate 19 at a position spaced from the end of conveyor 13 and in alignment therewith to stop the movement of articles across the plate 19.

Means are provided for segregating rows of articles after six such articles have been delivered by the conveyor onto plate 19. In the form shown, such means comprise a pusher element or member 21, the length of which is equal to the thickness of six articles A. Pusher 21 is connected to the movable piston rod 22 of an air cylinder 23 which is controlled by means of an electrically operated air valve (not shown) which valve may be controlled by means of a switch 24 having an actuating arm 25 located in the stop 20 for engaging the article at the end of the row which engages the stop 20. When an article engages the actuating arm 25 there will be six such articles in front of the pusher 21 and the articles will then operate the switch 24 to cause the air cylinder 23 to operate and move the pusher into the dotted position B thereof. It will be noted that the pusher 21 also has a retainer plate 26 extending at right angles to the pusher 21 for retaining the articles at the end of the conveyor 13 until the row of articles being pushed has been moved as far as possible by the pusher

21. The air cylinder moves the pusher outwardly to the dotted position B thereof and then retracts the pusher into the full line position shown. More articles A will then be delivered in front of the pusher to actuate the switch 24 again which operates the air cylinder. This collecting process is repeated until the fourth row of articles has been pushed by the pusher transversely of the plate 19. Of course as each succeeding row of articles is moved into place by the pusher, the preceding rows will also be moved further along the plate 19 and be guided by the adjustable upstanding guides 27 and the movable guide wall or gate 28. An adjustable stop 29 is also provided to retain the rows of articles in the desired position on the plate 19. Another switch 30 having an actuating arm 31 is secured on the stop 29 and the arm 31 engages the row of articles adjacent thereto to be operated when the pusher 21 moves the articles into such a position that the actuating arm 31 is engaged. Switch 30 operates to prevent the electrically operated air valve of air cylinder 23 from operating while four rows of articles are disposed between the guides 27 and gate 28.

It should be noted that the guiding gate or wall 28 is hingedly mounted at 29 to the supporting structure and normally maintained in an upright position by springs 28a, and the gate 28 is swingable downwardly into substantially horizontal position to permit the plurality of rows of articles to be slid thereover and off plate 19.

When four rows of six articles each have been collected on the plate 19, a carton blank, which may be of the type shown in Fig. 5 and indicated by the letter C, may be placed over the collected articles substantially as shown in dotted lines in Fig. 2. It will be noted that the carton blank C is substantially tubular in form with the top flaps T extending directly upwardly, not having as yet been bent at the score lines, and the bottom flaps F being bent at the score lines or flared outwardly in the manner of a funnel so as to effectively funnel the tops of the articles into the open lower end of the carton blank. As the carton C is moved downwardly over the articles, the bottom flaps F engage the top of plate 19 and slide outwardly so that the articles A may be substantially completely received into the body portion of the carton. It should be understood that it is possible to use the present machine with cartons of the type having one end already sealed closed. However, the instant invention functions, as hereinafter described, in such a manner that carton blanks of generally tubular form may be used and the flaps thereof will be bent inwardly sufficiently so that the carton may be readily handled even through it contains the articles.

Means are provided in the present invention for inverting the articles with the carton thereon and simultaneously closing the top flaps T thereof so that the carton actually contains the articles when the same is removed from the machine. In the form shown, such means include a carrier which is indicated in general by numeral 32 and which receives and inverts the articles and cartons. Carrier 32 includes a shaft 33 which is journaled in suitable bearings 34 at its opposite ends on the supporting structure 10. A plurality of article-supporting members or plates 35 corresponding in number to the number of rows of articles to be loaded into the carton, are secured to the shaft 33, by means of mounting bosses and set screws 36. The article supporting members or plates 35 are identical in shape with relation to each other and are each symmetrically shaped with respect to the rotation axis of shaft 33. Each of the article-supporting plates 35 has a plurality of openings 37 formed around the periphery thereof and in each of the openings 37 an insert element is removably secured to the plate 35 by means of connecting links 39 which may be bolted to the insert element 38 and the plate 35. The insert elements

38 are also constructed of plate material and are disposed in edge-to-edge alignment with the plates 35.

The carrier 32, including the supporting plates 35 is swingably about the rotation axis of shaft 33 to two positions, one of the positions being inverted with respect to the other. At the inner side of opening 37, the supporting member or plate 35 defines an article-supporting surface 40 which, in the first position of the carrier 32, is disposed generally horizontal and in substantial alignment with the article support 19 to facilitate ready and easy sliding of the articles from the support 19 onto the article-supporting surface 40. In the first position of the carrier 32, the lower supporting surface 40 overlies the rotation axis of shaft 33 and of the carrier 32 and the inner end portion of the article supporting surface 40 extends well beyond the rotation axis. The insert 38 defines an abutment 41 adjacent the inner end of the article-supporting surface 40 to restrain sliding of the cartons and articles along the surface 40 when the carrier is rotated and when the surface 40 is inclined with the inner end portion thereof disposed below the outer end portion thereof. The insert 38 also defines a ledge or shoulder surface portion 42 opposite the inner or lower end portion of the article-supporting surface 40 and disposed in opposed and spaced relation therefrom at a distance to accommodate the body portion of the carton C therebetween. At the upper side of opening 37, an upper article-supporting surface or seat is defined in the form of the invention shown in Fig. 2 by means of the edge 43 of insert element 38 which is disposed in widely spaced and opposed relation with the supporting surface 40. It should be noted that the inner edge 44 of plate 35 is parallel to the edge 43 of insert element 38 and will comprise the upper article-supporting surface or seat of the carrier when a different insert 45 of the type shown in Fig. 4 is used in connection with the carrier 32 and the plates 35.

The insert element 38 also defines a flap-guiding surface 46 which is disposed at an oblique angle with respect to the article-supporting surface 40 and which is parallel to the surface 47 of the plate 35. One of the lower flaps F of the carton C will engage the surface 46 and restrain inward movement of the carton C.

A latching mechanism is provided for retaining the carrier 32 in its several positions and for releasing the carrier permitting the same to move when a plurality of articles with the carton thereover are moved into the openings 37 of the article-supporting plates 35 and over the article-supporting surfaces 40. In the form shown, such latching mechanism includes a pair of keeper elements 48 secured on one of the article-supporting plates 35 in substantially diametrically opposed relation with respect to each other. It should be noted that in the form shown the outer ends of the keeper elements 48 extend slightly outwardly beyond the periphery of the plates 35. A movable latching or securing element 49 is swingably mounted on a pivot 50 which is mounted in a pair of ears 51 which are affixed to the supporting structure 10. The latch has a stop 52 thereon and a camming element 53 spaced from the stop 52. It should be noted that as the keeper element 48 moves in a clockwise direction toward the latching member 49, the outer end of the keeper element will engage the camming element 53 and swing the same outwardly. A spring 54, which is mounted on a bolt 55, bears against an angle iron 56 which comprises a portion of the supporting structure and also bears against the latching member 49, urging the latching member 49 toward the keeper element 48 causing the same to be received in the recess between the camming element 53 and the stop 52 whereby to secure the keeper element 48 in a fixed position.

Releasing mechanism is provided and in the form shown includes a pair of projectible and retractable release elements 57, the outer ends of which are slidably carried in suitable bearings 58 secured to the keeper element

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48 and in alignment with the stop 52 of the latching member 49. The inner ends of release members 57 are swingably secured to actuating levers 59, the upper ends of which extend upwardly beyond the article-supporting surfaces 40 to be engaged by the articles carried thereon, and the lower ends of which are swingably secured to the carrier plate 35. Springs 60 are anchored on the plate 35 and are connected with the arms 59 for retaining the release members 57 in their inwardly shifted position.

Means are provided for receiving and conveying the inverted carton with the articles therein out of the carrier 32 after the same has been moved to its second position. In the form shown, such means include a belt conveyor indicated in general by numeral 61 and including a plurality of narrow endless V-type belt conveyors 62 trained over pulleys 63 and 64 which are secured on the shafts 65 and 66 respectively. The shafts 65 and 66 are suitably journaled in bearings 67 and 68 respectively which are supported on a vertically adjustable frame 69 which is supported at its opposite ends on threaded studs or bolts 70 and 71. Bolts 70 and 71 are vertically adjustably secured to the supporting structure 10 by means of adjustable nuts 72 and thereby vertical adjustment of either or both ends of the conveyor frame 69 is facilitated. The upper runs of the conveyor belts 62 are supported in upwardly facing channels 73 which are vertically adjustably supported on the conveyor frame 69. A pair of cross members 74 and 75 are secured on the conveyor frame 69 and are provided with slots 76 extending substantially throughout the lengths thereof. The conveyor-supporting channels 73 are each provided with a pair of depending threaded bolts 77 at the opposite ends thereof which extend downwardly through the slots 76 of the cross members 74 and 75 and are secured therein by means of nuts to facilitate vertical adjustment of the channels 73.

It will be noted that the upper carton-carrying surfaces of the conveyor belts 62 are disposed above the outer end portion of the article-supporting seat of the carrier plates 35 when the carrier 32 is disposed in its second inverted position. As will be more fully set forth hereinafter, this relationship facilitates the lifting of the cartons off the seats 43 and thereby carrying the cartons away out of the carrier 32.

Means are provided for guiding the folded top flaps T of the carton into the opening 37 of each of the carrier plates 35. In the form shown, such means comprise a pair of stationary guide rods 78 which are disposed in opposed and widely spaced relation above the outer end portion of the article-supporting surfaces 40. Guide rods 78 are supported on the supporting structure 10 of the machine.

Means are also provided for guiding the lower flaps F which extend outwardly beyond the plates 35, over the shaft 33 as the cartons and articles are moved from the article support 19 onto the carrier 32. In the form shown, such means comprise a pair of guide rods 79 which are secured below the edge of the article support 19 which extend over the shaft 33.

Another conveyor 80 may be disposed in end-to-end relation with the conveyor 61 to receive and carry the cartons with the articles therein away from the machine and to facilitate further handling thereof. In the form shown, such a conveyor 80 may be provided with an outer support 81 which may be vertically adjustable. Conveyor 80 may be driven by a sprocket and chain connection to the shaft 65. It should be noted that the conveyor 61 is driven from the motor 18 through a step-down gearing mechanism which may be contained within the motor housing and which is connected to the shaft 66 by means of a sprocket and chain 82.

In operation, the articles A will be collected in four rows of six articles per row and the carton will be placed over the articles as previously described herein. An

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operator will fold the top flaps T of the carton inwardly at the conventionally provided score lines, and will then push the articles with the carton thereon onto the four juxtaposed article-supporting surfaces 40 of the carrier plates 35. The articles and carton will be pushed to the inner end of surface 40 so that the carton engages the abutment 41 and the upper corner of the carton is disposed beneath the shoulder surface 42. Of course the top flaps T of the carton will spring upwardly and the edges of a pair of these flaps will engage the article-supporting seat 43. It will be noted that the abutment 41 is disposed in such a position that the weight of the articles and carton is beyond the rotation axis of the carrier 32 so that the center of gravity of the articles is in vertical disalignment with the rotation axis. As the carton is pushed into the dotted position X as shown in Fig. 2, the carton will engage the actuating arm 59 of the releasing mechanism, and the latching member 49 will be moved slightly to the right to release the keeper element 48. The weight of the articles in the carton causes rotation of the carrier 32 and the carrier will rotate in a clockwise direction. As the carrier is rotated by the weight of the articles, the weight of the carton will be supported on the shoulder surface portion 42 of the insert 38 and subsequently the upper rear corner of the carton will tip onto the upper supporting surface 43 to be supported thereon. Of course as this occurs the carton will have been substantially inverted and the carton will of course move away from the article-supporting surface 40. As the carrier 32 continues to swing about the rotation axis thereof, the outer end portion of the article-supporting seat 43 will swing below the upper surfaces of conveyor belts 62 and the conveyor belts will lift the corner of the carton off the seat 43. When the conveyor has lifted the carton, it will draw the carton off the shoulder surface portion 42 and will carry the carton out of the opening 37.

It should be understood that as the carton is being inverted and as the weight of the carton is supported on the upper supporting surface or seat 43, the top flaps T of the carton will close tightly so as to prevent any possibility of the articles sliding out of the carton. When the carton is picked up by the conveyor 61, the carton rests upon the inwardly folded top flaps T and the bottom flaps F of the carton are still in outwardly extended position. It should be understood that the microswitches 24 and 30 may be replaced by pilot air valves to operate the pneumatic valves controlling air cylinder 23.

It should also be noted that there is a pair of conveyor belts 62 on opposite sides of each of the carrier plates 35 so as to provide as much surface area of the conveyor in engagement with the bottom of the carton as is needed to pull the carton off the supporting shoulder surface portion 42 after the carton has been inverted. In Figs. 3 and 4, different replacement inserts 45 and 45a are shown which may be secured in the manner shown to the carrier plates 35 to adapt the machine to handle cartons and articles of different sizes. It should be noted in Fig. 4 that the edge 44 of the plate 35 defines the upper article-supporting surface or seat and that the edge 47 defines the flap guiding surface of the carrier.

In the form of the invention shown in Fig. 3, the shoulder surface portion 83 and the upper article-supporting surface or seat 84 are disposed substantially closer to the article-supporting surface 40 than in the form shown in Fig. 2 whereby a smaller carton may be handled by this form of the invention.

It will be seen that I have provided new and improved apparatus of relatively simple and inexpensive construction and operation which facilitates the loading of carton blanks before either of the ends thereof have been sealed closed.

It should also be noted that I have provided a new and improved apparatus for readily and easily supporting articles, the upper ends of which extend into a carton,

and for inverting the articles into the carton to facilitate loading of the articles into the carton and further handling of the carton and articles together as one unit.

It should also be apparent that I have provided new and improved apparatus which, by the weight of the articles and carton, inverts the articles and the carton and causes the carton to engage the discharging conveyor in such a manner that the carton will positively be in an upright position as the carton is moved out of the machine after having been inverted.

It will, of course, be understood that various changes may be made in the form, detail, arrangement and proportion of the parts without departing from the scope of my invention which consists of the matter described herein and set forth in the appended claims.

What is claimed is:

1. In apparatus for loading a cluster of articles, such as packages into a carton which is provided with an open lower end, the combination of a supporting structure, a carton-carrier movably mounted on said structure for successive and cyclic movement from a first, receiving position to a second position at least partially inverted with respect to the first, said carrier having substantially planar, article-supporting means to initially support such a cluster of articles with a carton surrounding the same and with said articles extending into the open lower end of said carton, said supporting means tilting from said first position during the initial portion of the cycle of operation of said movable carrier to an inclined position where upper and lower portions of said article-supporting means are defined, and thence in the cycle of operation, moving into said second position for substantially inverting the articles and cartons, said carrier having an abutment disposed transversely of the lower portion of said article-supporting means to restrict sliding of the carton along said article-supporting means when the carrier is moved, said carrier also having a substantially angular, shoulder-forming abutment disposed in opposed relation to said lower portion of said article-supporting means and spaced therefrom a distance to accommodate the height of the carton therebetween, said shoulder-abutment being engaged in supporting relation with a corner of the carton during tilting and inversion by the carrier.

2. In apparatus for use in loading a row of articles into an open ended carton blank, the combination of a supporting structure, a carrier movably mounted on said supporting structure for successive movements between a first position and a second position at least partially inverted with respect to said first position, said carrier having an article-supporting surface for supporting such a row of articles which extend upwardly into the open lower end of such a carton blank, said surface moving with the carrier from the first position through an inclined position wherein upper and lower portions of the article-supporting portions of the article-supporting surface are defined and thence into the inverted position for inverting the articles and carton, said carrier having an abutment disposed transversely of the lower portion of said article-supporting surface for engaging the carton and restricting sliding thereof along said surface when the carrier is moved, said carrier also having a carton-supporting seat disposed above and in widely spaced and opposed relation with said surface, said seat engaging and retaining the carton upper flaps in inwardly bent position to facilitate closing of one end of the carton when the same is subsequently inverted, said carrier also having a carton-supporting ledge adjacent said abutment and between said surface and said seat, said ledge being disposed in opposed relation with the article-supporting surface and being spaced therefrom a distance to accommodate the carton therebetween whereby to engage a corner of the carton in supporting relation when the carton is inverted by the carrier, whereby when the carrier is moved to said second position the carton is inverted onto said ledge and thence tilted onto the carton-supporting seat and the flaps en-

gaged by the seat are bent inwardly in carton-closing relation.

3. In apparatus for use in loading a row of articles into an open-ended carton blank, the combination of supporting structure, a carrier movably mounted on said supporting structure for successive movements between a first position and a second position inverted with respect to said first position, said carrier having a carton-receiving opening therein defining a pair of spaced and opposed lower and upper surfaces for respectively supporting thereon the row of articles extending into the open lower end of the carton and the inverted carton with the articles therein when the carrier is moved from first position to second position, said carrier having an abutment between said surfaces for engaging the carton and restricting sliding thereof along said surfaces when the carrier is moved between said positions, said carrier also having a shoulder surface portion adjacent the abutment and between said surfaces and disposed in opposed and spaced relation with said lower surface to accommodate the carton therebetween, and a conveyor carrying the cartons outwardly from the carrier and having a receiving portion adjacent the carrier and disposed above and along the upper supporting surface when the carrier is inverted, whereby the carton may extend beyond said upper supporting surface and be tilted onto the shoulder surface portion and the upper supporting surface as the carrier is inverted and the carton will subsequently engage the conveyor and be carried out of the carrier thereby.

4. In apparatus for use in loading a row of articles into a carton blank of the type having open flaps at the opposite ends of the carton body portion, the combination of supporting structure, a carrier movably mounted on said supporting structure for successive movement between a first position and a second position inverted with respect to said first position, said carrier having a carton-receiving opening therein defining a pair of spaced and opposed lower and upper surfaces for respectively supporting the row of articles extending into the open lower end of the carton and supporting the carton with the articles therein when the carrier is inverted, said upper surface retaining, when the carrier is in said first position, the upper carton flaps in inwardly bent position, said carrier also having an abutment between said surfaces for engaging the carton and restricting thereof along said surfaces when the carrier is moved between said positions, said carrier also having a shoulder surface portion adjacent the abutment and between said surfaces and disposed in opposed and spaced relation with said lower surface to accommodate the carton therebetween and a receiving member extending along the upper supporting surface and spaced thereabove when the carrier is inverted, whereby the carton may extend beyond the upper supporting surface and be tilted when the carrier is inverted, onto the shoulder surface portion and the upper supporting surface to close the upper carton flaps and the carton will subsequently engage and be supported by said receiving member.

5. In apparatus for use in loading a row of articles into a carton having an open lower end, the combination of a supporting structure, a carrier swingably mounted on said supporting structure for successive movement from a first position to a second position inverted with respect to said first position, said carrier having an article-supporting surface for supporting such a row of articles which extend upwardly into the open lower end of such a carton, said surface extending in the first position of the carrier, over the swing axis thereof and having an inner end portion extending outwardly beyond said axis to facilitate supporting of the articles and cartons in vertical disalignment with the axis whereby the weight of the articles exerts torque on the carrier causing the same to swing about the axis to said second position, said carrier having an abutment disposed adjacent the inner end of the surface to restrict sliding of the carton therealong as the carrier

is inverted, said carrier also having a shoulder surface portion disposed in opposed relation with the inner end portion of the article-supporting surface and being spaced therefrom a distance to accommodate the carton therebetween, said shoulder surface portion being engageable in supporting relation with a corner of the carton when the same is inverted by the carrier, and a conveyor for carrying the cartons away from the carrier and having a receiving portion disposed in opposed relation with the article-supporting surface when said surface is inverted with the carrier, whereby when the articles with the carton thereon are moved onto said supporting surface, the carton and articles will cause swinging of the carrier and the carton and articles will be inverted and the carton with the articles therein will be carried away by the conveyor.

6. The structure recited in claim 5 and a releasable latching mechanism operatively connected with the carrier and the supporting structure and positioned to restrain swinging of the carrier from said first position, and a movable release element connected with said latching mechanism and disposed above said article-supporting surface when the carrier is in said first position and arranged to be engaged and operated by the articles when the same are moved on the article-supporting surface toward the abutment whereby to release the carrier to permit movement thereof for inverting the articles and cartons.

7. In apparatus for use in loading a plurality of rows of articles into a carton having an open end, the combination of a supporting structure having an article support for carrying adjacent rows of articles which extend upwardly into the open lower end of such a carton, a carrier movably mounted on said supporting structure for successive movement from a first position to a second position inverted with respect to said first position, said carrier having article-supporting surface means disposed when the carrier is in said first position, in substantially coplanar relation with said article support whereby to facilitate sliding of the articles and carton onto said surface means, said surface means moving with the carrier from the first position into an inclined position wherein upper and lower portions of said surface means are defined and thence into the inverted position for inverting the articles and cartons, said carrier having an abutment disposed adjacent the lower portion of said surface means whereby to engage the carton and restrict sliding thereof along the surface when the carrier is moved, said carrier also having a shoulder surface portion disposed in opposed relation with the lower portion of said article-supporting surface means and being spaced therefrom a distance to accommodate the cartons therebetween, said shoulder portion being engageable in supporting relation with a corner of the carton when the same is inverted by the carrier, and a conveyor mounted on said supporting structure, said conveyor having a receiving portion disposed in opposed relation with the article-supporting surface means when the latter is inverted with the carrier, said conveyor also having a delivery portion extending outwardly from the carrier, whereby the shoulder surface portion and the receiving portion of the conveyor support the carton when the same has been inverted and the carton will be moved out of the carrier by the conveyor.

8. In apparatus for use in loading a plurality of rows of articles into an open-ended carton, the combination of a supporting structure, a carrier swingably mounted on a generally horizontal axis on said supporting structure for successive movement from a first position to a second position inverted with respect to said first position, said carrier including a plurality of axially spaced support members having aligned openings therein defining spaced and opposed lower and upper surfaces, the lower surfaces of said members supporting when the carrier is in said first position, respective rows of articles which extend upwardly into the open lower end of the carton, said

carrier having an abutment between said surfaces for engaging and restricting sliding thereof along said surfaces when the carrier is moved between said positions, said carrier also having a shoulder surface in said opening and adjacent the abutment and disposed in opposed and spaced relation with said lower surface to accommodate a carton therebetween, and a conveyor carrying the cartons outwardly from the carrier and having a plurality of axially spaced receiving portions disposed between said support member and above the upper surfaces thereof when the carrier is in second position, whereby when the carrier is moved from first position to second position, the articles are inverted into the carton of which one corner is supported on said shoulder surface portion and another corner is supported on the upper surfaces of said members until the conveyor receiving portion lifts the carton off said upper surfaces and carries the carton outwardly of the carrier.

9. The structure recited in claim 8 and including an article support disposed transversely outwardly from said carrier for collecting such rows of articles thereon and guide means on said support for aligning respective rows of articles with the spaced lower surface of the support members when the carrier is in said first position.

10. The structure recited in claim 8 and including carton flap supporting means disposed outwardly in an axial direction from said support members to engage the outwardly extending flaps of the open lower end of the carton through which the articles are received and thereby stabilizing the carton on the lower supporting surfaces.

11. In apparatus for use in loading successive rows of articles into cartons having open lower ends, the combination of a supporting structure, a carrier rotatably mounted on said supporting structure for successive movements between positions inverted with respect to each other, said carrier having a plurality of similar carton-receiving openings spaced therearound for successively carrying and inverting cartons placed therein as the carrier is moved between said positions, said carrier having, with relation to each of said openings, a first position and a second position inverted with respect to said first position, each of said openings defining a pair of spaced and opposed lower and upper surfaces for respectively supporting thereon the row of articles which extend into the open lower end of the carton and supporting the inverted carton with the articles therein when the carrier is moved from said first position to said second position, said carrier having abutments in each of said openings between said surfaces for engaging the carton and restricting sliding thereof along said surfaces when the carrier is moved between said positions, said carrier also having a shoulder surface portion in each of the openings between said upper and lower surfaces and disposed in opposed and spaced relation with said lower surface to accommodate the carton therebetween, and a conveyor carrying the cartons outwardly from the carrier and having a receiving portion adjacent the carrier and extending above and along a respective upper supporting surface when the carrier is in said second position, whereby the articles with the carton thereon may be inserted into successive openings of the carrier as the carrier is successively rotated between adjacent positions to cause the articles to be completely deposited into the cartons as the cartons and articles are inverted and carried away by the conveyor.

12. In apparatus for use in loading a row of articles into a carton having an open lower end, the combination of a supporting structure, an article supporting member movably mounted on said supporting structure for successive movement from a first position to a second position inverted with respect to said first position, said article supporting member having an article-supporting surface for supporting such a row of articles which extend upwardly into the open lower end of such a carton, said surface moving with the supporting member from said first position into an inclined position wherein upper

and lower portions of the article-supporting surface are defined and thence into the inverted position for inverting the articles and carton, said article-supporting member having an abutment disposed transversely of the lower portion of said article-supporting surface whereby to engage the carton and restrict sliding thereof along the surface when the article-supporting member is moved from said first position, a replaceable insert element removably secured to said article-supporting member and being movable therewith, said insert element defining a shoulder surface disposed in opposed relation with the lower portion of said article-supporting surface and being spaced therefrom a distance to accommodate the carton therebetween, said shoulder surface being engageable in supporting relation with a corner of the carton when the same is inverted by the article-supporting member, and a conveyor mounted on said supporting structure and having a receiving portion disposed in opposed relation with the article-supporting surface when the latter is inverted with the article-supporting member, and said conveyor also having a delivery portion extending outwardly from the article-supporting member, whereby said insert element may be replaced with a similar insert element of different size to accommodate cartons of different sizes on the article-supporting member.

13. The structure as set forth in claim 12 wherein said insert element also defines an article supporting seat disposed adjacent said shoulder surface and in widely spaced and opposed relation with said article-supporting surface, said seat being spaced from said article-supporting surface farther than the spacing between said shoulder surface and the article-supporting surface whereby to facilitate tilting of the carton onto said seat as the article-supporting member is moved to said second position, the receiving portion of said conveyor extending along and being disposed above said seat when the article-supporting member is in said second position, whereby said insert element can be replaced by similar insert elements of different size to accommodate cartons of different sizes to be inverted on the article-supporting member.

14. The structure recited in claim 13 and the receiving portion of said conveyor being vertically adjustable to facilitate engaging of the cartons above the seat when different insert elements are secured to the article-supporting member and different size cartons are carried thereby.

15. In apparatus for use in loading a row of articles into a carton having an open lower end, the combination of a supporting structure, a carrier rotatably mounted on said supporting structure for successive movement between different positions, said carrier having a plurality of similar carton-receiving openings spaced therearound for successively carrying and inverting cartons placed therein as the carrier is moved between said positions, said carrier having, with relation to each of said openings, a first position and a second position inverted with respect to said first position, each of said openings defining a pair of spaced and opposed lower and upper surfaces for supporting the row of articles which extend upwardly into the open lower end of the carton and supporting the inverted carton with the articles therein when the carrier is moved from first position to said second position, each of said lower surfaces extending in the corresponding first position of the carrier, over the rotation axis thereof and having an inner end por-

tion extending transversely beyond said axis to facilitate supporting of the articles and cartons in vertical disalignment with the axis whereby the weight of the articles exerts torque on the carrier causing the same to swing about said axis to said second position, said carrier having abutments disposed adjacent the lower ends of said surfaces to restrict sliding of the cartons therealong as the carrier is inverted, said carrier also having a shoulder surface portion in each of the openings between said upper and lower surfaces and disposed in opposed and spaced relation with the corresponding lower surface to accommodate the carton therebetween, and a conveyor carrying the cartons outwardly from the carrier and having a receiving portion adjacent the carrier and extending above and along each respective upper supporting surface when the carrier is in said second position, whereby a carton, placed in one of the openings on the lower supporting surface thereof, will invert the carrier and move the carrier into the first position defined in relation to the other opening to facilitate placing of additional articles and another carton in said last mentioned opening.

16. The structure recited in claim 7 and said carrier being swingably mounted for movement about an axis, said article support being disposed outwardly, transversely of said axis, of said carrier, whereby to facilitate ready and easy feeding of the articles with the carton thereon into the carrier.

17. In apparatus for use in loading a row of articles into a carton having an open lower end, the combination of a supporting structure having surface means over which such articles are supplied in one direction, a carrier swingably mounted on said supporting structure adjacent the surface means for successive movement about an axis extending transverse to said one direction and from a first position to a second position inverted with respect to said first position, said carrier having an article-supporting surface for receiving such a row of articles from the surface means and supporting the row of articles which extend upwardly into the open lower end of such a carton, said article-supporting surface swinging with the carrier from the first position through an inclined position wherein upper and lower portions of the article-supporting surface are defined and thence into inverted position for inverting the articles and carton, said carrier having carton-engaging means positioning the carton and articles therein in vertical disalignment with the swing axis and also preventing sliding of the carton along the article-supporting surface when the carrier is inverted, the weight of the articles exerting torque on the carrier, causing the same to swing about the axis to said second position, and a receiving member on the supporting structure and below said article-supporting surface when the carrier has been swung to inverted position, said receiving member being spaced from the inverted article-supporting surface a distance to accommodate the inverted carton therebetween.

References Cited in the file of this patent

UNITED STATES PATENTS

2,016,418	Eberling et al. _____	Oct. 8, 1935
2,024,503	Bickford _____	Dec. 17, 1935
2,646,197	Silva _____	July 21, 1953
2,713,959	Gilbert et al. _____	July 26, 1955