

July 28, 1942.

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2,291,010

CARTON FEEDING APPARATUS

Filed July 12, 1940

4 Sheets-Sheet 1

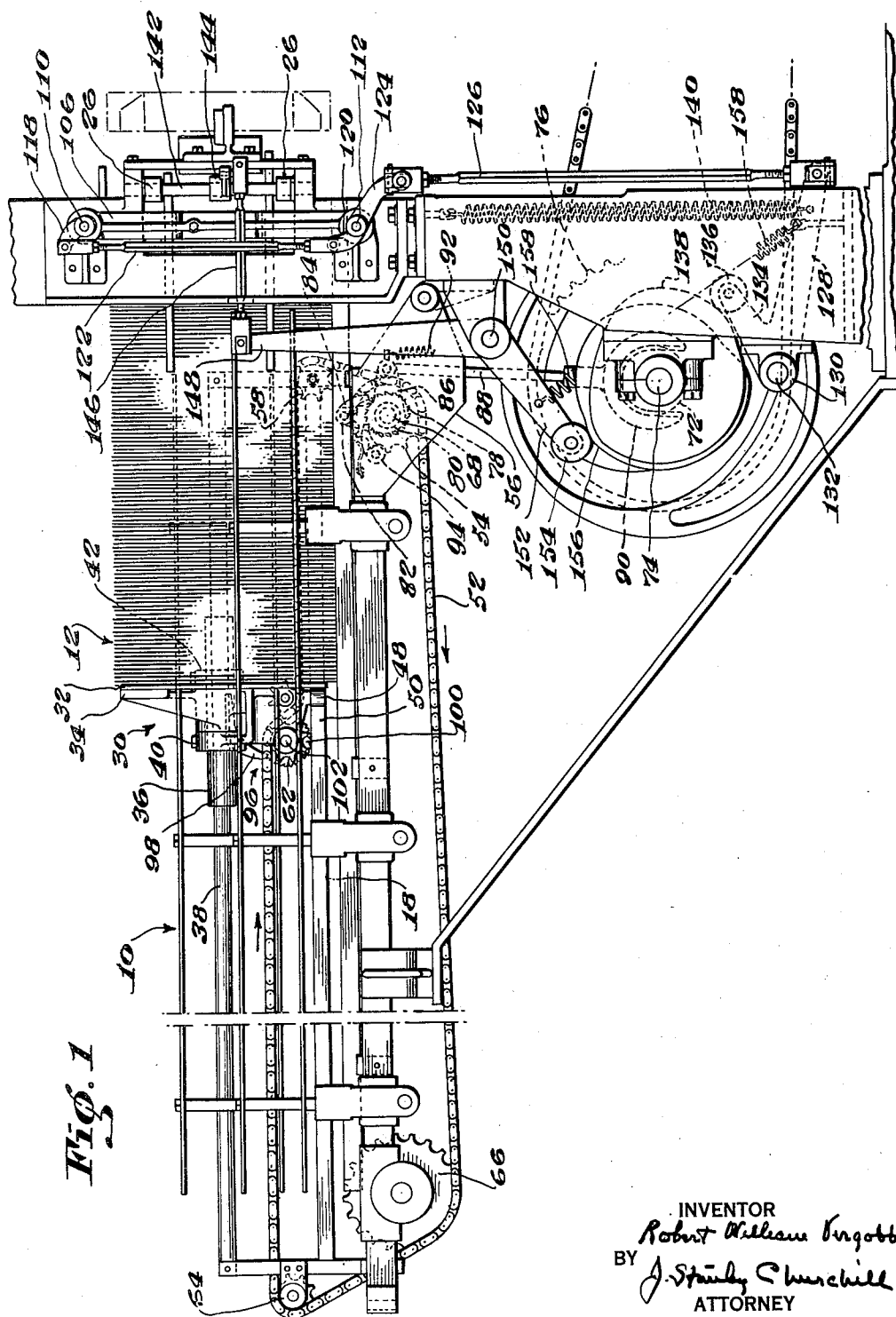


Fig. 1

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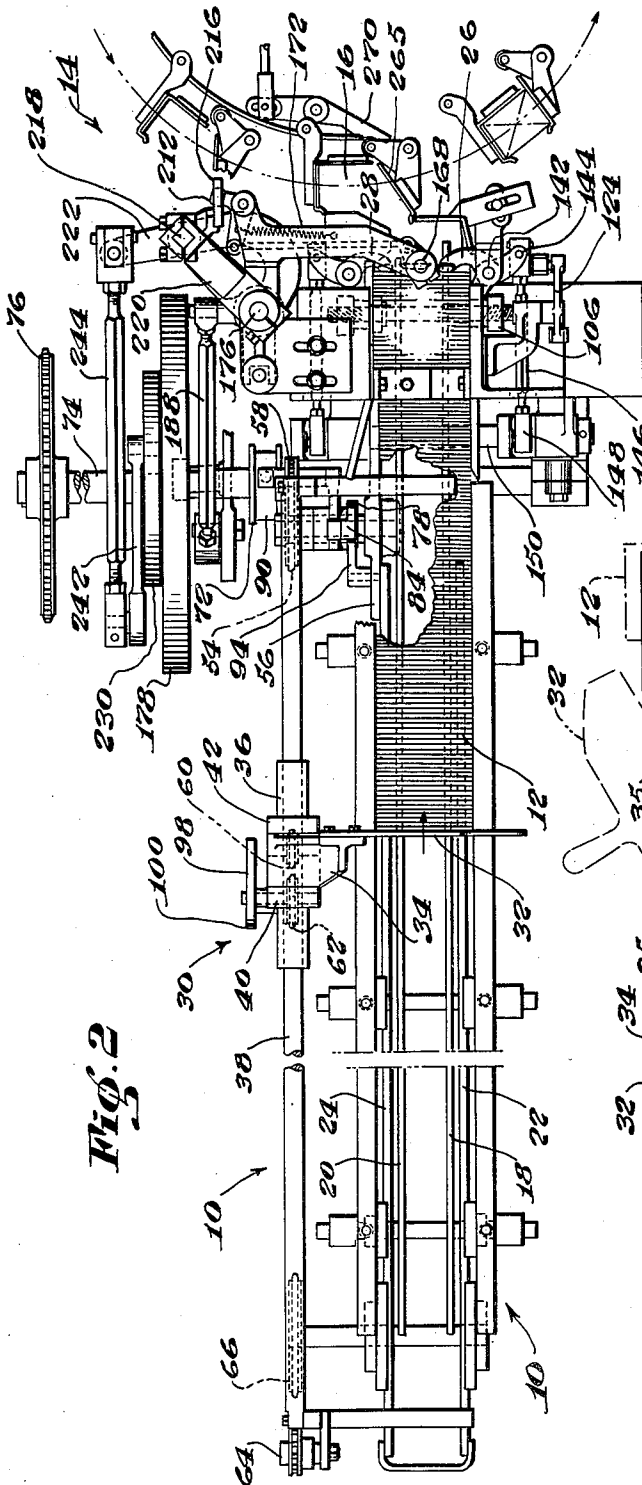


Fig. 2

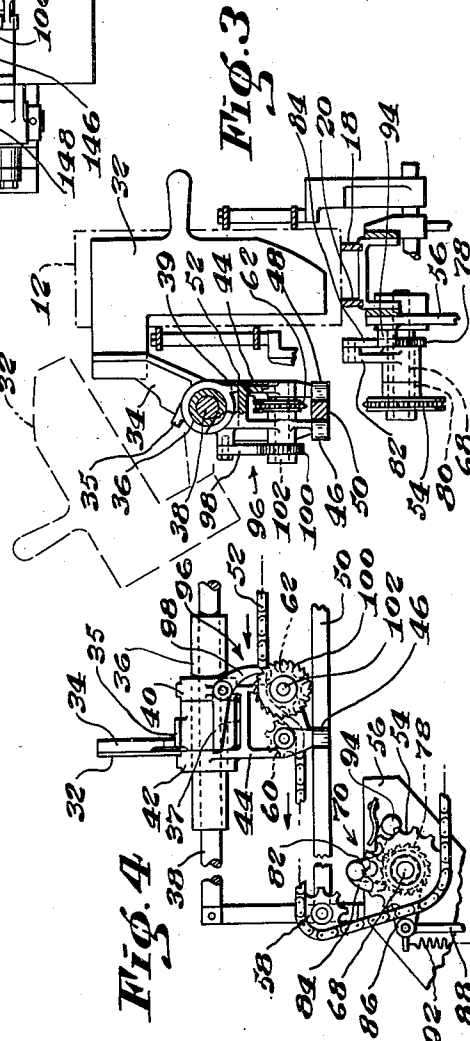


Fig. 3

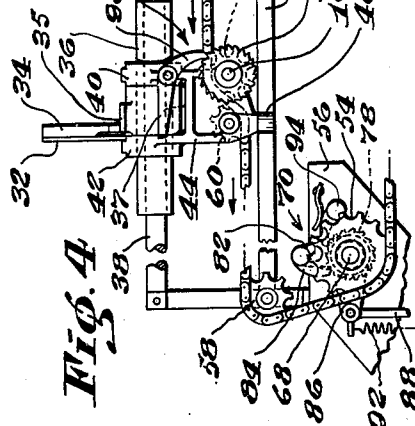


Fig. 4

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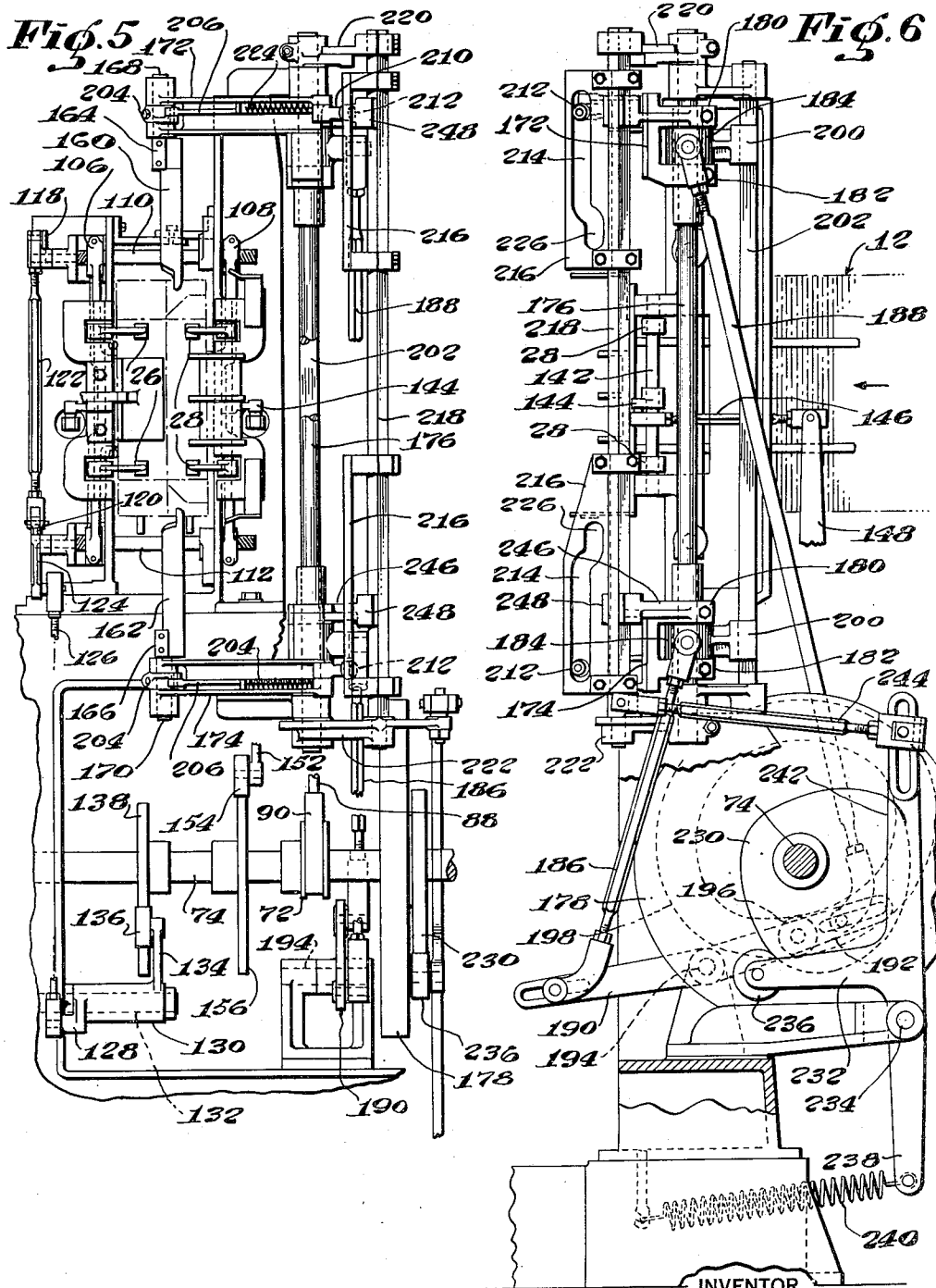
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4 Sheets-Sheet 3



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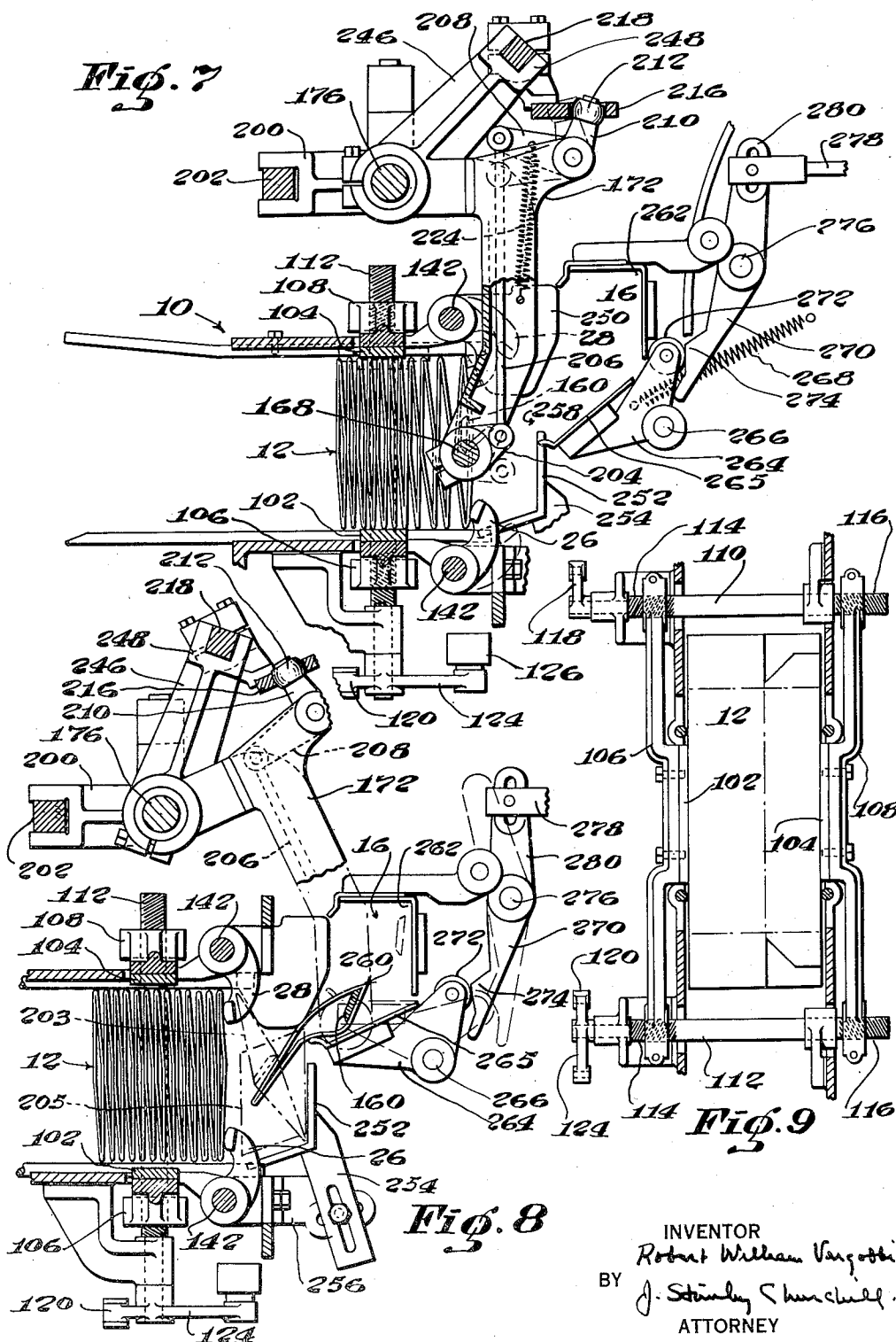
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Fig. 7



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CARTON FEEDING APPARATUS

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19 Claims. (Cl. 93—53)

This invention relates to carton feeding apparatus.

The invention has for an object to provide a novel and improved carton feeding apparatus which is adapted to handle and feed a stack of knocked-down or collapsed cartons and to open successively fed cartons and to deliver the same into a pocket of a carrier by which the open cartons may be presented to folding and sealing instrumentalities closing the bottom of the carton preparatory to the filling thereof. The improved carton feeding apparatus is simple in construction, positive in operation and lends itself particularly for handling cartons formed of relatively thin carton forming material or board.

With this general object in view and such others as may hereinafter appear, the invention consists in the carton feeding apparatus and in the various structures, arrangements and combinations of parts hereinafter described and particularly defined in the claims at the end of this specification.

In the drawings illustrating the preferred embodiment of the invention, Fig. 1 is a side elevation of a carton feeder embodying the present invention; Fig. 2 is a plan view of the carton feeder shown in Fig. 1; Fig. 3 is a detail view in front elevation, and partly in cross-section, of mechanism for advancing the stack of knocked-down cartons in the conveyer; Fig. 4 is a side elevation of the mechanism shown in Fig. 3; Figs. 5 and 6 are front and side elevations respectively of the carton withdrawing and opening mechanism to be referred to; Fig. 7 is an enlarged plan view of a portion of the mechanism shown in Figs. 5 and 6 showing the parts in position for withdrawing the foremost carton in the stack; Fig. 8 is a similar view showing the carton being transferred into the pocket; and Fig. 9 is an enlarged detail view, partly in cross-section of the mechanism for providing lateral pressure against the forward portion of the stack.

In general, the present invention contemplates carton feeding apparatus in which provision is made for feeding the stack of the collapsed cartons in a horizontal direction and which are arranged with the individual collapsed cartons standing on edge. The apparatus is provided with carton withdrawing and opening means including a carton opening member which is arranged to enter the endmost carton in the stack, and provision is made for feeding the entire stack of cartons forwardly to cause the endmost carton to assume a definite position prior to the

entrance of the carton opening member therein, so that at such time, the entire stack of cartons comprises a dense mass by reason of the pressure exerted upon the stack during the feeding operation. In order to facilitate the withdrawal of the endmost carton from the stack, provision is made for liberating a relatively few of the endmost cartons in the stack from the feeding pressure which has thus been exerted upon the stack. For this purpose, laterally operative clamping members are preferably arranged to clamp the stack between them and to relieve the pressure from the endmost cartons in the stack. While the carton stack is thus held by the lateral clamping means, provision is made for moving the stops against which the endmost carton has been pressed during the carton feeding operation so that a few of the endmost cartons assume a loose condition by reason of the inherent spring in the individual cartons themselves. After the cartons have assumed this condition, the carton opening member is inserted into the endmost carton and preferably moved in a novel and improved manner to open the carton and transfer it to a pocket comprising one of the series of pockets upon a carrier. The movement of the carton opening member and the relation of the pocket and associated guides to the carton opening member cooperate to effect the opening of the carton, the collapsing of the carton through substantially 180 degrees to break the material at the vertical creases forming the corners of the carton, and the subsequent disposition of the carton in the pocket, in such manner as to insure most satisfactory and efficient squaring up of the carton therein. Another feature of the invention contemplates the provision of novel and improved mechanism for feeding the carton stack forwardly and for enabling the machine to be supplied with a fresh supply of cartons in a simple and convenient manner.

Referring now to the drawings, 10 represents a magazine arranged to support a stack of knocked-down cartons 12 in a position to present the foremost carton in the stack in operative relation to a carton opening and transferring device, indicated generally at 14 and to a carton pocket 16 to which the carton is transferred in its open or squared up condition. As herein shown, the stack of cartons are supported vertically with their lower edges resting upon bottom rails 18, 20, and the stack is supported laterally between guide rails 22, 24, as shown in Figs. 1 and 2. The forward end of the stack is supported by movable stop fingers 26, 28 and pro-

vision is made for advancing the stack along the magazine and for pressing the forward end of the stack against the stop fingers 26, 28 as the cartons are withdrawn therefrom during the operation of the machine.

Referring now to Figs. 1, 2, 3 and 4, the mechanism for advancing and applying pressure to the rear of the stack 12, indicated generally at 30, may comprise a presser plate 32 engageable with the rear of the stack and which is carried by a lever 34 rockingly mounted upon a hollow shaft 36. The hollow shaft 36 is slidably mounted upon an elongated slide rod 38 extending lengthwise of the conveyor 10. As herein illustrated, the presser plate lever 34 is supported between hubs 40, 42 of a bracket 44 which is fixed to the hollow sliding shaft 36. The lower end of the bracket 44 is provided with a pair of rollers 46, 48 which embrace an elongated square shaped guide rod 50 in order to retain the bracket in a vertical position.

Provision is made for advancing the bracket 44 and the sliding unit bodily along the slide rod 38 to press the stack forward a distance sufficient to compensate for the carton withdrawn during each cycle of operation of the machine. As herein shown, the unit is advanced by means of an endless chain 52 which passes over a driving sprocket 54 supported in a bracket 56 attached to the forward end of the magazine 10, an idler sprocket 58, sprockets 60, 62 supported upon the movable bracket 44, and idler sprockets 64, 66 supported at the rear portion of the conveyor. The driving sprocket 54 is mounted upon a shaft 68 and is arranged to be rotated by a pawl and ratchet mechanism 70 operated by an eccentric cam 72 fast on the cam shaft 74. The cam shaft 74 may be driven by a chain connection from the main portion of the packaging machine, not shown, to a sprocket 76 fixed to the end of the shaft, as shown in Figs. 1 and 2. As herein illustrated, the ratchet 78 is fixed to the end of an elongated hub 80 extending from the driving sprocket 54 and a pawl carrier arm 82 is rockingly mounted on the hub 80 between the sprocket and the ratchet. The pawl carrier arm 82 is provided with a pawl 84 which cooperates with the ratchet 78 when the arm is rocked to turn the sprocket and move the chain 52. A second arm 86 extending from the pawl carrier hub is connected by a link 88 to a yoke 90 which cooperates with the eccentric cam 72. A spring 92 fixed to the arm 86 tends to hold the eccentric against the cam and is arranged to rock the pawl carrying arm 82 to advance the chain 52 when the cam is rotated. Thus, the stack is held under spring tension when the movement of the chain is transmitted to the stack advancing mechanism 30, as will be described, rather than being positively moved during each cycle. In other words, in the event that the stack is in a sufficiently compressed condition the spring 92 will not operate to actuate the pawl and ratchet device 70. As viewed in Fig. 1, the pawl 84 is arranged to rotate the ratchet 78 in a clockwise direction, and a second pawl 94 mounted in the bracket 56 is arranged to prevent reverse movement of the ratchet.

As illustrated in Figs. 1 and 4, a second pawl and ratchet mechanism 96 is provided on the advancing unit 30, the pawl 98 being pivotally mounted on the bracket 44 and the ratchet 100 being secured to the shaft 102 upon which the sprocket 62 is mounted. The pawl 98 is normally in operative engagement with the ratchet 100.

As a result of this construction, it will be observed that when the chain 52 is moved in the direction of the arrows, Fig. 1, the engagement of the ratchet 100 with the pawl 98 prevents rotation of the shaft 102 and sprocket 62 so that the chain, in cooperation with the sprocket 62, will effect a movement of the advancing unit 30 in a direction such as to compress the stack against the stop fingers 26, 28. This construction also permits the sliding unit 30 to be retracted manually by disengaging the pawl 98 in order to permit the stack to be replenished with a fresh supply of cartons. As illustrated in Fig. 3, the presser member 32 and bracket 34 may be swung outwardly into the position shown in dotted lines, when it is desired to add more cartons.

Provision is also made for automatically disengaging the pawl 98 from its ratchet 100 when the presser plate 32 is rocked outwardly so as to permit the unit 30 to be free to move in either direction. As herein shown, the bracket 34 is provided with a lug 35 which is arranged to engage the tail 37 of the pawl 98 when the presser plate 32 is swung outwardly. In operation, with the pawl 98 thus disengaged, when the unit is manually retracted or advanced, the sprocket 62 is free to roll along the chain 52 in either direction. After the unit has been retracted, as described, and a fresh supply of cartons is deposited in the magazine, the presser plate is again rocked into its carton engaging position, thus freeing the pawl 98. However, the unit may still be manually advanced to press the unit into compressing engagement with the rear of the stack since, it will be observed, such advancement causes the sprocket 62 to rotate in a counter-clockwise direction, viewing Fig. 1, as it passes along the chain 52 and the pawl 98 merely slides over the ratchet teeth. Thereafter, when the chain 52 is moved, as described, the pawl prevents rotation of the sprocket and the unit is caused to be advanced to yieldingly compress the stack against the stop members 26, 28. A second stop lug 39 is provided on the bracket 34 which is arranged to engage the bracket 44 to limit the movement of the presser plate 32, as clearly shown in Fig. 3.

From the description thus far it will be observed that during one portion of the operation of the apparatus, the stack of cartons in the magazine 10 are pressed with substantial pressure to cause the endmost carton to be forced against the movable stop members 26, 28 in a position such as is shown in Fig. 2. The stack of cartons in the magazine is compressed by such pressure and provision is made, in accordance with the present invention, for relieving the endmost carton from the effect of such pressure during that part of the operation of the machine when it is desired to effect the withdrawal and opening of the carton. In the illustrated and preferred embodiment of the invention, this result is accomplished by a pair of carton engaging members 102, 104 which are arranged to be moved into position to engage the lateral edges of at least one, and as herein shown, a plurality of those cartons immediately in the rear of the first few cartons at the discharge end of the magazine so that when such clamping members are forced into engagement with the cartons, the effect of the pressure which is being exerted by the carton feeding means, as above described, is relieved from those cartons which are immediately in advance of the clamping means. After the clamping means have been

brought into operative clamping position, provision is made for rocking the stop members 26, 28 forwardly into a position such as to permit the endmost carton to move into carton opening position and permit the natural spring in the collapsed and compressed carton to restore it to a loose uncompressed condition, such as to facilitate the introduction therein of the carton opening members, as will be hereinafter described.

As illustrated in detail in Figs. 7, 8 and 9, the clamping members 102, 104 for engaging and holding the cartons, as above described, are mounted upon brackets 106, 108, each provided with a threaded hole adapted to cooperate with threaded portions upon operating shafts 110, 112 journaled in suitable bearings in the machine frame. The threaded holes in the brackets 106, 108 are arranged to thread onto right and left hand threads 114, 116 respectively, of the threaded portions of each shaft so that upon rotation of each shaft, the brackets are simultaneously moved toward and from one another, depending upon the rotation of the shaft, thus effecting movement of the clamping members into and out of clamping engagement with the lateral edges of the collapsed cartons, as clearly shown in Figs. 7 and 9. In order to operate the clamping members 102, 104 to move the same into and from clamping position, the shafts 110, 112 are arranged to be rotated by connections including arms 118, 120 secured upon the ends of shafts 110, 112 connected by a connecting link 122 to operate in unison. The second end 124 of the lower arm 120 is arranged to be connected by a link 126 to one arm 128 of a cam lever 130 pivoted at 132 and the second arm 134 of the cam lever is provided with a cam roll 136 arranged to cooperate with the operating cam 138 upon the cam shaft 74 of the machine, see Fig. 1. A spring 140 serves to maintain the cam roll 136 in engagement with its cam 138 and to yieldingly urge the clamping members 102, 104 through the connections described into engagement with the edges of the cartons when permitted to do so by the cam.

The operating mechanism for moving the stop members 26, 28 into and from carton engaging position includes two sets of connections, each of which comprises a vertical shaft 142 upon which the stop arms 26, 28 are secured, an operating arm 144 secured to the shaft connected by a link 146 to the upper end of an operating lever 148 pivoted at a cross-shaft 150 and the cross-shaft is provided with a cam arm 152 secured thereto having a cam roll 154 which cooperates with an operating cam 156 upon the cam shaft 74, a spring 158 serving to hold the cam roll against the cam, as shown in Fig. 1. In operation the cam 156 through the connections described operates to move the arms 26, 28 into the position illustrated in Figs. 2 and 8, where the feeding pressure exerted upon the stack of cartons 12 serves to compress the entire stack and hold the endmost carton against the stop members.

In the operation of the machine, as above described, after the clamping members 102, 104 are moved into clamping position, the cam 156 operates to permit the spring 158 to move the stop arms 26, 28 into the position shown in Fig. 7 where the pressure upon the few cartons in advance of the clamping members is relieved and the endmost carton permitted, by the inherent spring in the cartons, to be moved into a position ready to receive the carton opening mem-

bers, the carton at this time resting against the stop arms in the position shown in full lines in Fig. 7.

In the operation of the machine, after the endmost carton has assumed the position shown in Fig. 7, provision is made for moving a carton opening member into the endmost carton and, as herein shown, two carton opening knives 160, 162 are provided, mounted as illustrated in Fig. 5, upon supporting members 164, 166 attached to the bottom and top respectively, of studs 168, 170 carried by and mounted in suitable bearings in supporting brackets 172, 174, slidably mounted upon a vertical shaft 176 to be capable of being moved toward one another in order to be introduced into the endmost carton from the top and bottom thereof. Movement of the supporting brackets 172, 174 and associated parts vertically upon the shaft is, as herein shown, effected from an operating cam 178 on the cam shaft 74 through connections including spaced hubs 180, 182 forming a part of each knife supporting member and between each pair of which is disposed a hub 184 mounted to slide on the shaft 176. The hubs 184 are connected by links 186, 188 to the opposite arms 190, 192 of a rocking member pivoted at 194, one arm 192 of which carries a cam roll 196 arranged to travel in a closed cam path 198 of the cam 178. The sliding hubs 184 are each provided with an arm 200 integral therewith adapted to slidably embrace a square rod 202 mounted in a stationary part of the machine frame thus enabling the knife supporting brackets 172, 174 to be rocked with relation to the hubs 184 as will be described. From an inspection of Figs. 5 and 6, it will be apparent that the cam 178 operates through the connections described to effect the introduction of the knives 160, 162 into the carton and subsequently to remove the same therefrom.

In the operation of the machine, after the knives 160, 162 have been partially introduced into the carton, provision is made for swinging the brackets 172, 174 to effect withdrawal of the carton from the end of the stack, as will be described, and, during this withdrawal movement and while the knives are still being moved into the carton, provision is made for twisting the knives to cause them to assume a position transverse to the major axis of the collapsed cartons to cause the carton to assume the position illustrated in dotted lines at 203 in Fig. 8, and to thereby effect the opening of the carton sufficiently so that subsequent movement of the knives in introducing the carton into the pocket 16 of the carrier or conveyer which may form part of the carton closing machine, may not effect the buckling of the carton or the undesired bending of the same. As herein shown, the mechanism for effecting twisting of the knives includes an arm 204 clamped upon each stud 168, 170 connected by a link 206 to one arm 208 of a bell-crank, the second arm 210 of which is provided with a cam roll 212 arranged to ride in a cam path 214 in a bracket or plate 216 secured to and carried by a square shaft 218 mounted in suitable supporting members 220, 222 at its upper and lower end in fixed relation to the knife carrying brackets 172, 174. As herein shown, the supporting arms 220, 222 are clamped to the upper and lower ends of the vertical shaft 176 and are arranged to be rocked therewith when the supporting members 172, 174 are moved to cause the knives 160, 162 to transfer the carton into the pocket 16, as will be described. The

cam brackets 216 are adjustably clamped to the square shaft 218 in a position with relation to the vertically moving knife supporting brackets 172, 174 such as to cause the knives to be twisted as described just before they have reached their maximum inward movement into the carton. As illustrated in Fig. 7, a spring 224 is provided in each knife twisting unit which tends to urge the knife blades into the angular position described when the rollers 212 enter the end portions 226 of the cam paths 214, near the end of the stroke of the inserting knives.

Referring now to Figs. 2, 5 and 6, as therein shown, provision is made for swinging the knife carrying brackets 172, 174 so as to move the carton from the magazine and to bend it in a direction reverse to its natural collapsed position or through substantially 180 degrees to thereby assist in breaking the corner creases of the carton so that, when the carton is squared up in the pocket it will assume a perfectly rectangular shape. Provision is also made for effecting movement of the carton as the knife carrying brackets 172, 174 continue to swing to deposit the carton in a carton receiving pocket. As illustrated in Figs. 5 and 6, the vertical shaft 176 is arranged to be rocked to swing the knife carrying brackets 172, 174 to effect transfer of the carton from the end of the stack into the pocket through connections from a cam 230 on the cam shaft 74 including a three-armed cam lever 232 pivotally mounted at 234 and having a cam roller 236 cooperating with the cam 230. A second arm 238 is provided with a spring 240 arranged to hold the cam roller against its cam, and a third arm 242 is connected by a link 244 to the curved arm 222 which is clamped to the lower end of the vertical shaft 176. As hereinbefore described, the lower arm 222 is connected by the square shaft 218 to the upper arm 220, and the slidably mounted and rockingly supported knife supporting members 172, 174 are each provided with arms 246, having square shaped ends 248 adapted to slidably embrace the square shaft 218 so that in operation, when the arms 220, 222 are rocked through the connections described, the swinging brackets 172, 174 are moved to permit the knives 160, 162 to transfer the carton to the pocket 16. It will be observed that the spring 240 tends to swing the brackets 172, 174 outwardly when permitted to do so by the cam 230.

In the operation of the machine, during the initial swinging movements of the knives 160, 162, the carton is moved to the position indicated in dotted lines at 203 in Fig. 8 during which time the knives are twisted to open the carton as above described, and during subsequent swinging movement of the knives, the leading corner of the carton is directed by the knives between two fixed guide members, herein shown as comprising a plate 250 mounted upon the magazine frame and an angular bracket 252 mounted upon a plate 254 adjustably secured in a bracket 256 also secured to the magazine frame, and these guide members are arranged to form, in effect, a narrow throat 258 and to engage the side panels and corner portions of the carton being thus moved, which are immediately adjacent the leading edge or corner 260 of the carton so that as the knives continue to move the carton is first fully opened up as indicated at 205 in dotted lines in Fig. 8 and thereafter as the leading corner 260 of the carton passes through the narrow throat 258, the carton is bent back upon itself

through substantially 180 degrees, the rear faces or panels of the carton moving rearwardly during this operation and the angular bracket 252 being spaced sufficiently from the end of the magazine to permit this rearward movement of the rear faces of the carton during the swinging movement of the knife.

The leading corner 260 of the carton is moved through the narrow throat 258 and toward the corner 262 of the carton receiving pocket and when the carton arrives at the position shown in full lines in Fig. 8, part way into the pocket, provision is made for bending the carton still further along the creased edges in a direction opposite to that which they assumed when the cartons were in their flat or knocked-down condition in the stack in order to counteract the inherent spring of the carton along the edges which would otherwise tend to return the carton to its original flat position and cause the carton to assume an irregular position in the pocket. As illustrated in Figs. 7 and 8, this operation is performed by swinging the movable side 265 of the pocket 16 from its fully opened position, as shown in Fig. 7, into engagement with the side of the carton as the latter passes through the narrow throat 258. As herein shown, the movable side 265 of the pocket is mounted upon an arm 264 pivoted at 266 to permit it to swing against the tension of a spring 268 when an operating cam 270 holds the cam roll 272 in the position shown in Fig. 7. When the operating cam 270 is rocked counterclockwise, as viewed in Figs. 7 and 8, the roller 272 rides along the high spot 274 of the cam which permits the side 265 to engage the carton as illustrated in Fig. 8 to bend the carton as described. Further movement of the carton into the pocket will permit the carton to open up naturally into its rectangular position in the pocket whereupon further rocking movement of the operating cam causes the movable side 265 to close in upon the carton to hold it in its squared up position in the pocket. In the operation of the machine, the knives 160, 162 are thereafter withdrawn and the knife supporting arms 172, 174 are swung back to their original position in readiness to be inserted into a succeeding carton. As illustrated diagrammatically in Figs. 2, 7 and 8, the operating cam 270, pivotally mounted at 276 may form a part of the packaging machine, and may be connected to an operating cam, not shown, by the link 278 and lever 280 forming part of the cam 270.

From the description above of the improved carton feeding apparatus and of its operation, it will be observed that the apparatus is relatively simple in construction and positive in operation and that the cartons are successively opened and moved into the successive pockets of the carrier in a manner such as to minimize buckling and tearing of the cartons, thus enabling the apparatus to be used in feeding cartons composed of relatively thin board.

While the preferred embodiment of the invention has been herein illustrated and described, it will be understood that the invention may be embodied in other forms within the scope of the following claims.

Having thus described the invention, what is claimed is:

1. Carton feeding apparatus having, in combination, supporting means for a stack of collapsed cartons to be fed, means for exerting pressure upon the stack to feed the same for-

wardly, stop means against which the stack of cartons are pressed by said pressing and feeding means, carton opening means adapted to enter the endmost carton in the stack, and means for relieving the normally exerted feeding pressure from a relatively few cartons at the forward end of the stack prior to the removal of the endmost carton therefrom whereby to facilitate the introduction of the carton opening means into the endmost carton.

2. Carton feeding apparatus having, in combination, supporting means for a stack of collapsed cartons to be fed, means for exerting endwise pressure upon the stack to feed the same forwardly, stop means against which the stack of cartons are pressed by said feeding means, carton opening means adapted to enter the endmost carton in the stack, and means for relieving the normally exerted feeding pressure from a relatively few cartons at the forward end of the stack prior to the removal of the endmost carton therefrom whereby to facilitate the introduction of the carton opening means into the endmost carton, said means including carton engaging means movable into a position to engage a carton spaced a short distance from the forward end of the stack.

3. Carton feeding apparatus having, in combination, a magazine for holding a stack of collapsed cartons and provided with a discharge end, pressing means for pressing the stack toward the discharge end of the magazine, means for relieving the pressure from the endmost carton in the stack prior to the removal of the endmost carton therefrom, and means for thereafter opening the endmost carton for removing it from the stack.

4. Carton feeding apparatus having, in combination, a magazine for holding a stack of collapsed cartons and provided with a discharge end, pressing means for pressing the stack toward the discharge end of the magazine, means for relieving the pressure from the endmost carton in the stack prior to the removal of the endmost carton therefrom, means for removing the endmost carton from the stack and for thereafter opening it into its fully opened condition.

5. Carton feeding apparatus having, in combination, a magazine for holding a stack of collapsed cartons and having a discharge end, pressing means for pressing the stack toward the discharge end of the magazine, means for relieving the endmost carton in the stack from the pressure exerted by said pressing means prior to the removal of said endmost carton from the stack, a carton opening member operable to enter the endmost carton after said pressure has been relieved, and means for moving the carton opening member away from the discharge end of the magazine to remove the carton from the stack.

6. Carton feeding apparatus having, in combination, a magazine for holding a stack of collapsed cartons and having a discharge end, pressing means for pressing the stack toward the discharge end of the magazine, means for relieving the endmost carton in the stack from the pressure exerted by said pressing means, a carton opening member operable to enter the endmost carton after said pressure has been relieved, and means for moving the carton opening member to remove the carton from the stack and for twisting the carton opening member to partially open the carton.

7. Carton feeding apparatus having, in com-

bination, a magazine for holding a stack of cartons and having a discharge end, pressing means for pressing the stack toward the discharge end of the magazine, stop means against which the endmost carton in the stack is pressed by the pressing means, means for moving the entire stop means into a position to relieve the pressure on the endmost carton, a carton opening member insertable into the carton when the pressure has been thus relieved, and means for moving the same to withdraw the carton from the stack.

8. Carton feeding apparatus having, in combination, a magazine for holding a stack of cartons having a discharge end, means for pressing the stack toward the discharge end of the magazine, means for relieving the endmost carton in the stack from pressure exerted by the pressing means prior to the removal of said endmost carton from the stack, means for removing the endmost carton from the stack, and carton opening means, said pressure relieving means including means for engaging a carton in the stack in the rear of the endmost carton.

9. Carton feeding apparatus having, in combination, a magazine for holding a stack of cartons and for pressing the stack toward the discharge end of the magazine and pressure relieving means for relieving the pressure on the endmost carton prior to the removal of said endmost carton from the stack including a member mounted upon the magazine and movable into a position to engage one of the cartons in the stack in the rear of said endmost carton, and a carton opening member insertable into the endmost carton when said pressure has been relieved therefrom.

10. Carton feeding apparatus having, in combination, a magazine for holding a stack of cartons, means for urging the stack toward the discharge end of the magazine, carton holding means movable into and from engagement with one of the cartons in the stack located in the rear of the endmost carton, stop means against which the endmost carton is pressed, operating mechanism for moving the carton holding means, and means for moving the entire stop means into pressure relieving position when the carton holding member has been moved into carton engaging position and when the pressure has been thus relieved.

11. Carton feeding apparatus, having, in combination, a magazine for holding a stack of cartons, means for urging the stack toward the discharge end of the magazine, carton holding means movable into and from engagement with one of the cartons in the stack located in the rear of the endmost carton, stop means comprising a pair of pivoted stop members cooperating with opposed marginal portions of the endmost carton and against which the endmost carton is pressed, operating mechanism for moving the carton holding means, and means for moving both pivoted stop members into a position to relieve the pressure on the endmost carton when the carton holding member has been moved into carton engaging position.

12. Carton feeding apparatus having, in combination, a magazine for holding a stack of cartons, means for urging the stack toward the discharge end thereof, carton holding means movable into and from engagement with one of the cartons in the stack in the rear of the endmost carton, a pair of pivoted stop members, operating mechanism for moving the carton holding means, and operating mechanism for

moving both pivoted stop members first into a position to relieve the pressure on the endmost carton and then into a position to permit discharge of the carton from the magazine, and carton opening means insertable into the endmost carton when said pressure has been relieved.

13. In a carton feeding machine, in combination, a carton receiving pocket having an opening at one side thereof through which the carton may be introduced into the pocket and having one of its sides pivotally mounted, a carton opening member arranged to be inserted into the endmost carton in the stack, means for moving the carton opening member to insert the same into the endmost carton to then withdraw the carton and move it laterally into the pocket, and two guide members disposed between the end of the magazine and the pocket in the path of the movement of the carton, said guides being spaced to form a narrow opening for effecting the folding back of the carton through substantially 180° as the carton is moved between the guides, and means for closing the pivotal side of the pocket after the carton has been introduced therein.

14. Carton feeding apparatus having, in combination, a magazine for supporting a stack of collapsed cartons to be fed, a presser member for engaging the stack, means for advancing the presser member to feed the stack forwardly, stop means against which the forward end of the stack is pressed, and carton opening means adapted to enter and withdraw successive cartons from the forward end of the stack, said presser member being mounted to be capable of being moved into an inoperative position to permit a fresh stack of cartons to be introduced into the magazine and when in such position to be automatically disconnected from said advancing means whereby to permit movement in either direction lengthwise of the stack.

15. Carton feeding apparatus having, in combination, a magazine for supporting a stack of collapsed cartons to be fed, a presser member for engaging the stack, means for advancing the presser member to feed the stack forwardly, stop means against which the forward end of the stack is pressed, carton opening means adapted to enter and withdraw successive cartons from the forward end of the stack, said presser member being mounted to be capable of being swung laterally with respect to the movement of the stack of cartons into an inoperative position, and means operated by such movement of the presser member for disconnecting it from said presser advancing means.

16. Carton feeding apparatus having, in combination, a magazine for supporting a stack of collapsed cartons to be fed, a presser member for engaging the stack, means for advancing the presser member to feed the stack forwardly, stop means against which the forward end of the stack is pressed, carton opening means adapted to enter and withdraw successive cartons from the forward end of the stack, said presser member being mounted to be capable of being moved into an inoperative position to permit a fresh stack of cartons to be introduced into the magazine and when in such position to be automatically disconnected from said advancing means whereby to permit movement into either direc-

tion lengthwise of the magazine, said stack advancing means including means for permitting the presser member to be manually retracted to permit a fresh supply of cartons to be deposited in the magazine.

17. In a carton feeding machine, in combination, a carton receiving pocket having an opening at one side thereof through which the carton may be introduced into the pocket and having a side adjacent said opening pivotally mounted, a carton opening member arranged to be inserted into the endmost carton in the stack, means for moving the carton opening member to insert the same into the endmost carton, to then withdraw the carton from the stack, and to then twist the carton opening member with relation to the carton into a position to direct a corner of the carton through the opening in the carton receiving pocket, a pair of guide members disposed between the end of the magazine and the pocket in the path of movement of the carton, means for closing the pivotal side of the carton receiving pocket into a position to form with the second guide member a narrow opening to effect the folding back of the carton through substantially 180° as the carton is moved between said pivotal side of the carton pocket and said guide member, and means for thereafter closing the pivotal side of the pocket to square up the carton in the pocket.

18. In a carton feeding machine, in combination, a carton receiving pocket provided with an opening in one side thereof through which the carton may be introduced into the pocket, a magazine for holding a stack of collapsed cartons, a carton transferring member movable into the endmost carton in the stack and operative to withdraw the carton therefrom and to transfer it directly into said pocket, a pair of guide members forming a relatively narrow opening in the path of movement of the carton, and means for twisting said carton opening member on its own axis during said transferring movement whereby to direct the leading corner of the carton through said relatively narrow opening to effect the folding back of the carton through substantially 180° during said transferring movement.

19. In a carton feeding machine, in combination, a carton receiving pocket provided with an opening in one side thereof through which the carton may be introduced into the pocket, a magazine for holding a stack of collapsed cartons, a carton transferring member movable into the endmost carton in the stack and operative to withdraw the carton therefrom and to transfer it directly into said pocket, a pair of guide members forming a relatively narrow opening in the path of movement of the carton, and means for twisting said carton opening member on its own axis during said transferring movement whereby to direct the leading corner of the carton through said relatively narrow opening to effect the folding back of the carton through substantially 180° during said transferring movement, said guides being shaped to engage and bend the panels of the carton into a fully opened position and to permit free movement of the carton into its opposite diagonally folded position during the transferring operation.

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