Sept. 13, 1955 H. R. HEDLUND ET AL 2,717,541

CARTON FORMING APPARATUS

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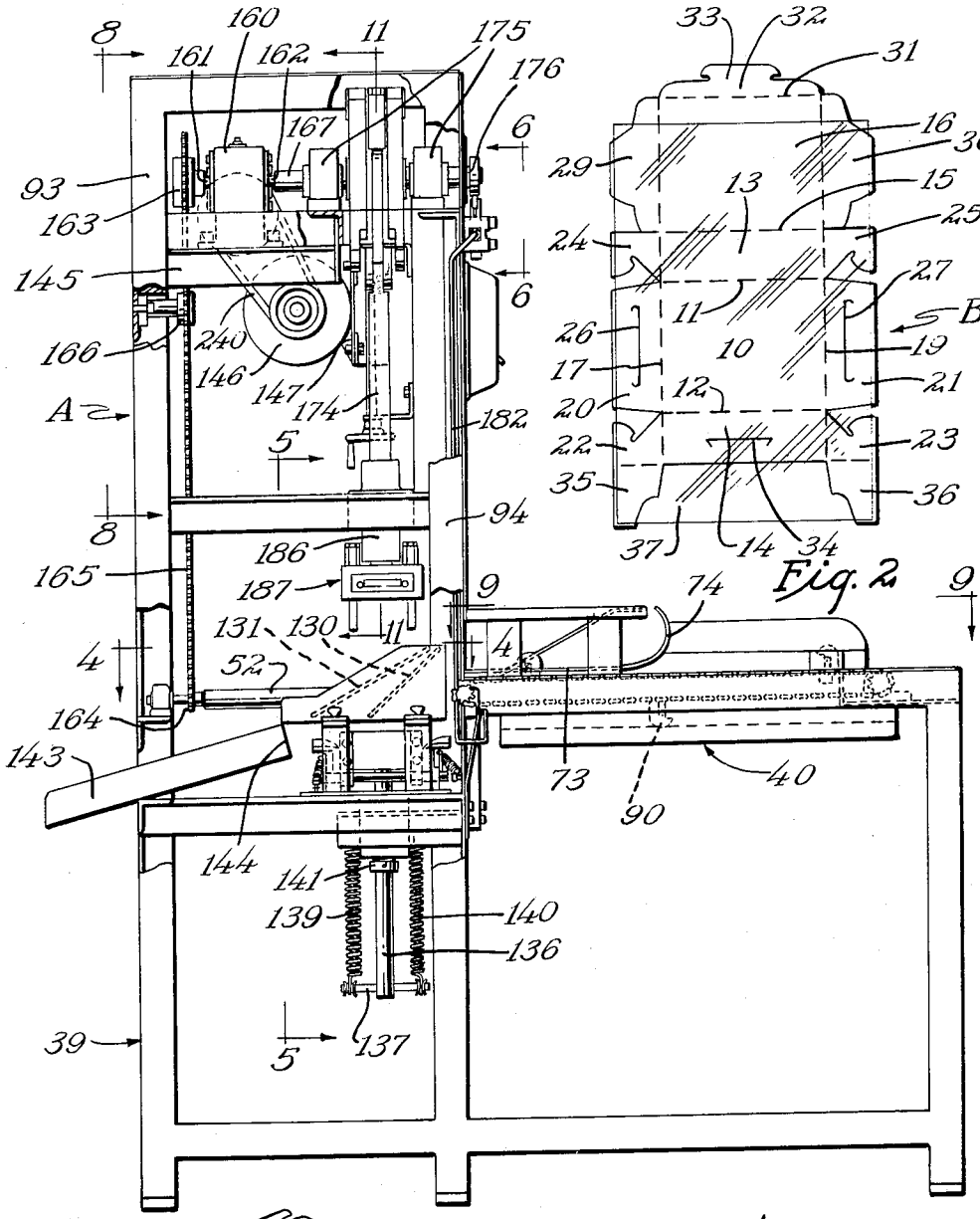


Fig. 2

Fig. 1

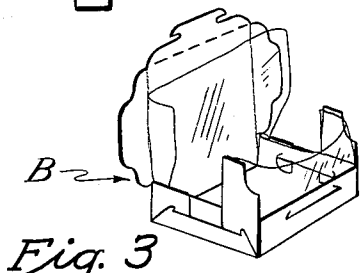


Fig. 3

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CARTON FORMING APPARATUS

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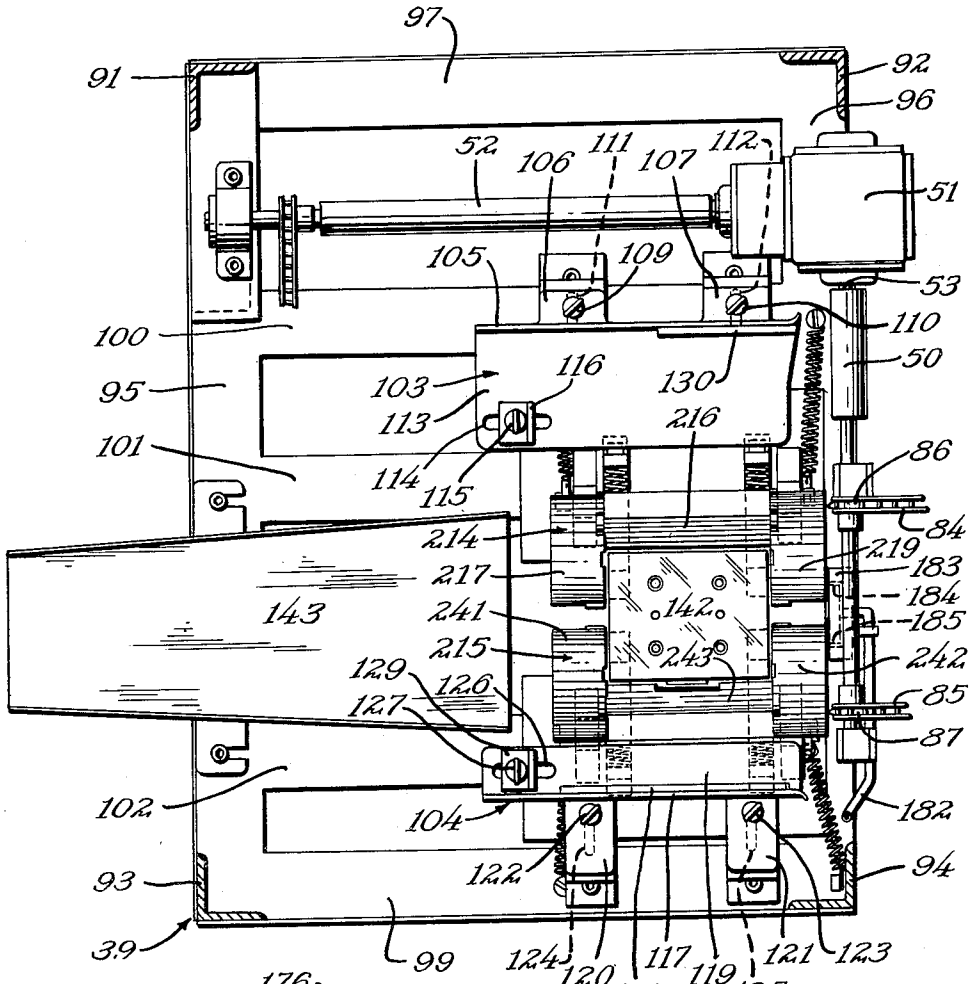


Fig. 4

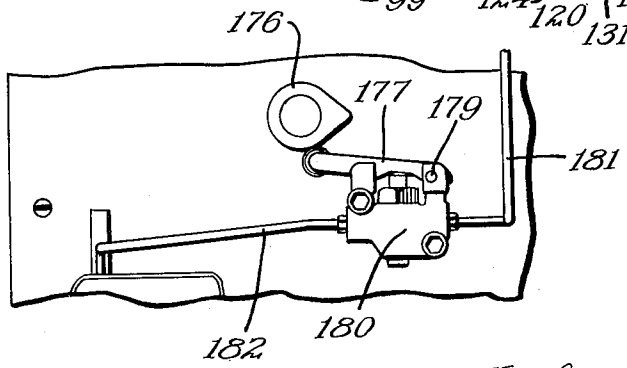


Fig. 6

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CARTON FORMING APPARATUS

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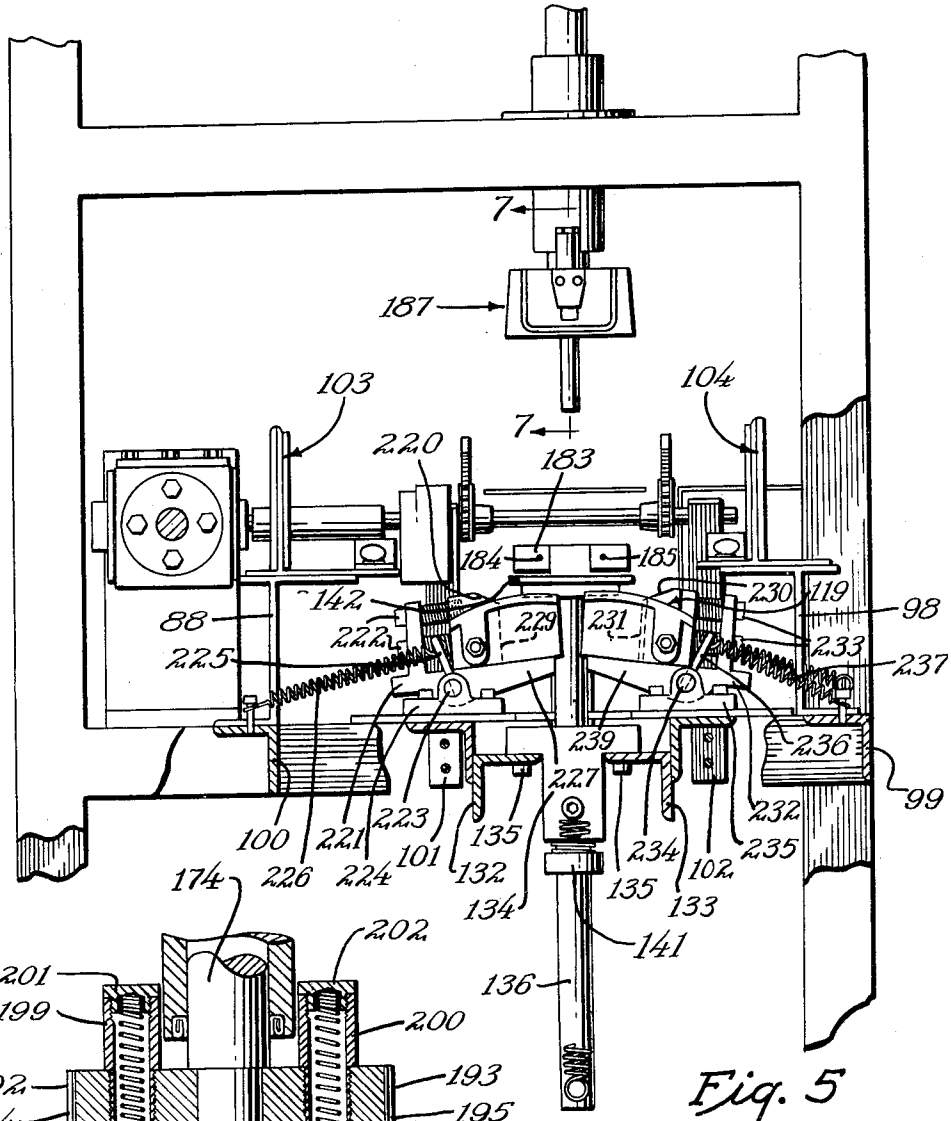


Fig. 5

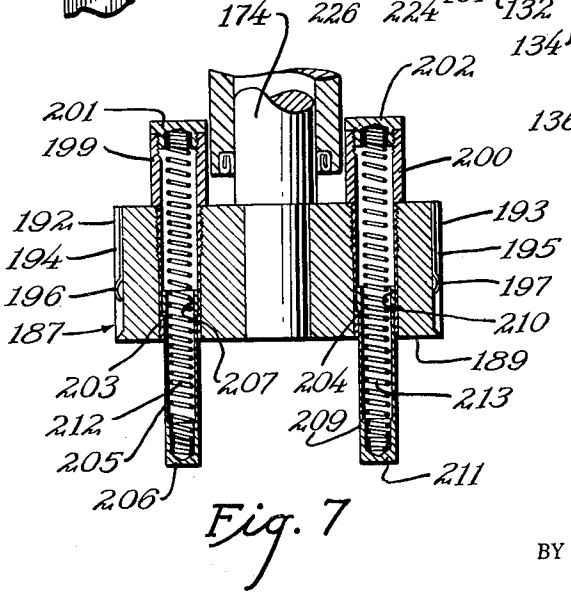


Fig. 7



Fig. 12

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CARTON FORMING APPARATUS

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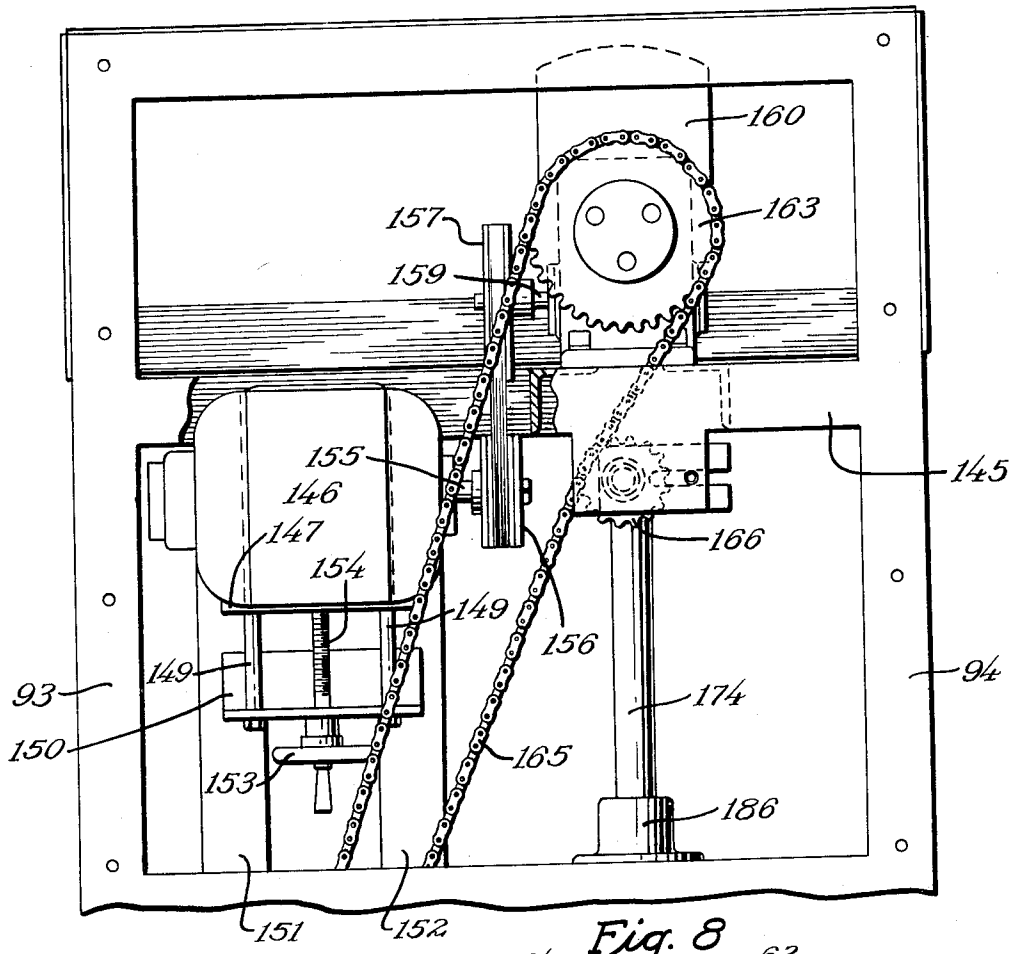


Fig. 8

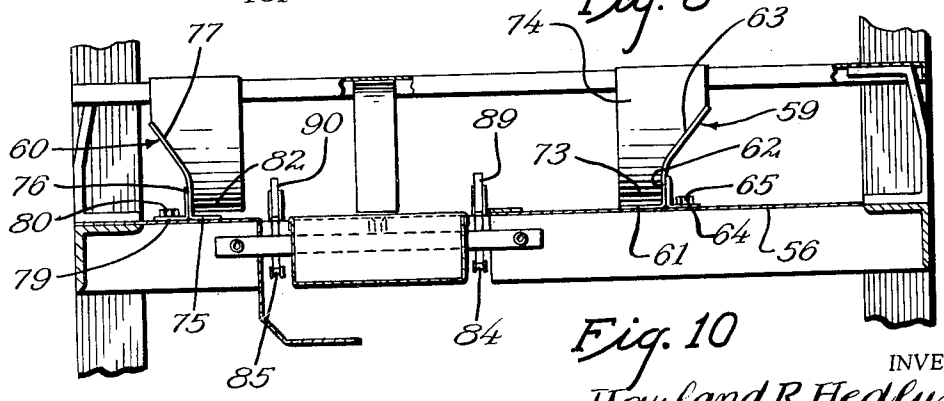


Fig. 10

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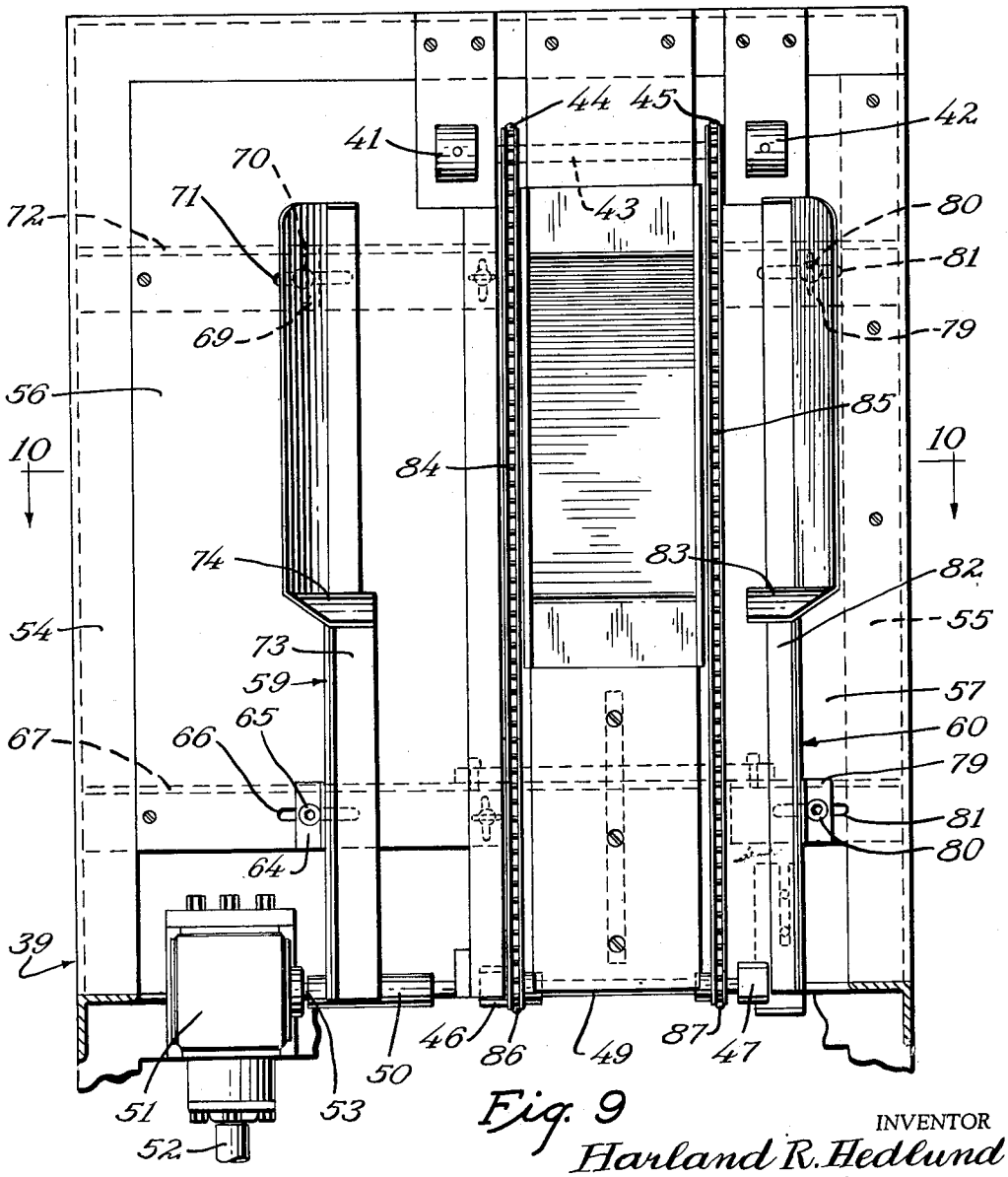


Fig. 9

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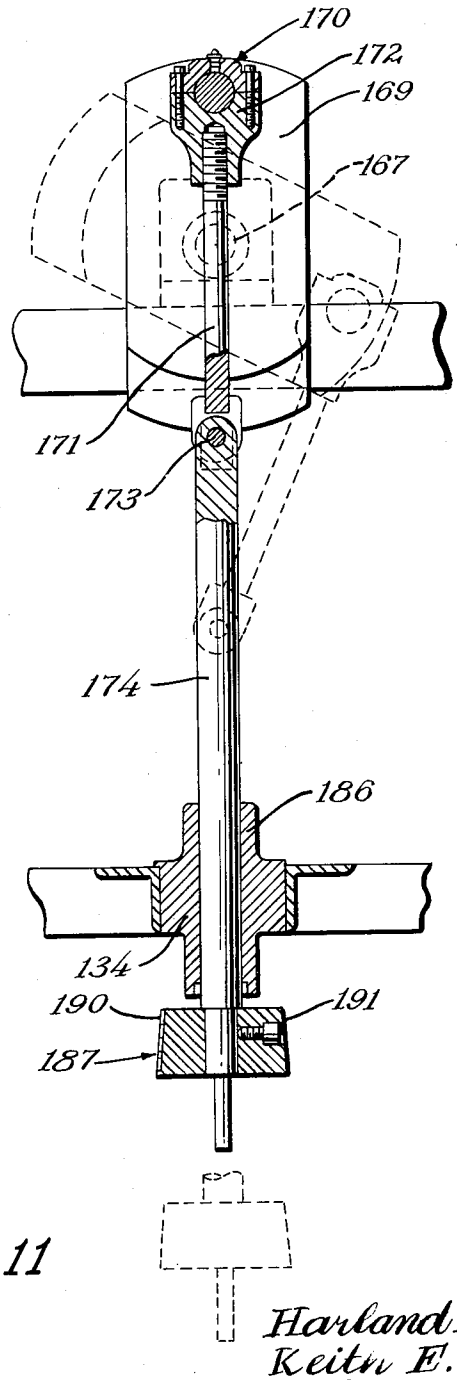


Fig. 11

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2,717,541

CARTON FORMING APPARATUS

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Application August 10, 1951, Serial No. 241,247

7 Claims. (Cl. 93—51)

This invention relates to an improvement in carton forming apparatus and deals particularly with an apparatus for advancing blanks in spaced relation to a carton forming apparatus.

An object of the present invention resides in the provision of an apparatus for forming flat carton blanks into tray shaped receptacles. The blanks are provided with hook shaped locks engageable in slots in cooperable carton walls to hold the walls in rectangular relation. The blanks are preferably provided with a liner of cellophane or other similar material, which liner folds inwardly of the carton walls in formed condition of the carton.

Cartons comprising paperboard blanks having liners of celiophane or similar material attached thereto are difficult to handle after they have been stored for any appreciable length of time. The blanks tend to adhere together after they have been stored in superposed relation for a period of time. As a result the usual feeding apparatus for handling carton blanks cannot be used in supplying the lined blanks to the forming apparatus. While carton feeding devices for automatically feeding lined blanks have been produced and used, such automatic feeds are costly to produce and difficult to maintain in proper operating order. As a result the hand feeding of such lined blanks has ordinarily been found more economical than automatic feeding of such devices.

The feeding of lined blanks to a carton forming device is usually a relatively slow process. It is usually necessary for the operator to strip a lined blank from a stack of blanks, to place the blank in forming position beneath a forming plunger while the plunger is operating, to start the machine so that the plunger will form the carton and to strip the next blank from the series while one carton is being formed. In order to prevent accidents and injury to the operator, the machines usually require that the operator start the machine in operation with the same hand which is used to feed the blanks so that the hand will not get caught beneath the forming plunger.

A feature of the present invention resides in the provision of a feeding device which permits the forming plunger to operate in regular cycles. This device comprises a conveyor which advances the blanks automatically into position beneath the forming plunger while the plunger is in elevated position. With such a device it is only necessary for the operator to strip each blank from the stack and to place the blanks upon a conveyor, which moves them in spaced relation into position above the former. As a result the carton forming operation can be operated at a much greater rate of speed.

A feature of the present invention resides in the provision of a carton forming apparatus including a plunger which forms the carton and a cooperable table upon which the carton rests during the forming operation. This table reciprocates vertically with the forming plunger and acts to elevate the carton after it has been formed. Thus after the formation of each carton it is elevated to a position from which it may be readily removed.

An added feature of the present invention lies in the

provision of a depressible table which acts to elevate the formed carton above the carton forming dies and in providing a blast of air which will blow the carton from the table when it is elevated. By this means the depressible table may be quickly cleared of each formed carton before the next blank is fed into position above the table.

Other features of the present invention reside in the arrangement of the various parts and in the carton forming dies which serve to form the carton into proper shape.

These and other objects and novel features of the present invention will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of the specification:

Figure 1 is a side elevational view of the carton forming mechanism showing the general relationship of the parts.

Figure 2 is a diagrammatic view of a form of blank which may be formed into tray formation by the device of Figure 1.

Figure 3 is a perspective view of the carton after it has been formed.

Figure 4 is a sectional view through the carton forming apparatus, the position of the section being indicated by the line 4—4 of Figure 1.

Figure 5 is an elevation view of a portion of the carton forming mechanism, a portion of the apparatus being broken away along the line 5—5 of Figure 1.

Figure 6 is a detail view of a portion of the apparatus, the position of the view being indicated by the line 6—6 of Figure 1.

Figure 7 is a sectional view through the head of the forming plunger, the position of the section being indicated by the line 7—7 of Figure 5.

Figure 8 is an elevation view of the upper portion of the forming device, the position of the view being indicated by the line 8—8 of Figure 1.

Figure 9 is a plan view of the feed mechanism, the position of the view being indicated by the line 9—9 of Figure 1.

Figure 10 is a sectional view through the feed mechanism the position of the section being indicated by the line 10—10 of Figure 9.

Figure 11 is a vertical sectional view through the plunger and its operating mechanism, the position of the section being indicated by the line 11—11 of Figure 1.

Figure 12 is a vertical view, partly in section, of a portion of a die folding member.

The carton forming machine is indicated in general by the letter A and is designed for use in forming blanks, such as the carton B illustrated in Figures 2 and 3 of the drawings. The carton B is shown as including a bottom panel 10 connected along parallel fold lines 11 and 12 to a rear wall 13 and a front wall 14. The rear wall 13 is shown connected along a fold line 15 to a cover panel 16. The blank is divided by parallel fold lines 17 and 19 which connect the bottom panel 10 to end walls 20 and 21. The fold lines 17 and 19 connect the front wall 14 to locking tabs 22 and 23. These fold lines also connect the rear panel 13 to locking tabs 24 and 25. The advance locking tabs are provided with locks which engage in slots 26 and 27 in the end walls 20 and 21.

The cover panel 16 is provided with locking flaps 29 and 30 which also extend through the slots 26 and 27. The cover panel 16 is connected along a fold line 31 to a locking flap 32 having a projecting lock 33 designed to extend through a slot 34 in the front panel 14 to hold the carton closed.

Projecting ears 35 and 36 are foldably connected to the locking tabs 22 and 23 and project beyond the remainder of the carton blank to form a support for the liner sheet 37. This liner sheet 37 is spot glued to the remainder of

the blank in such a way that the carton walls can be folded upwardly and connected in rectangular formation without interfering with the attachment of the liner. The carton B is shown in formed condition in Figure 3 of the drawings.

The forming machine A is provided with a frame 39 which acts to support a conveyor unit illustrated in general by the numeral 40. This conveyor unit is best illustrated in Figures 1, 9 and 10 of the drawings. A pair of transversely aligned bearings 41 and 42 support a transverse shaft 43 supporting a pair of chain sprockets 44 and 45. A similar pair of bearings 46 and 47 are connected to the frame with their axes aligned and parallel to the axes of the bearings 41 and 42. A shaft 49 is supported by the bearings 46 and 47. The shaft 49 is operated through a detachable connection 50 by a gear unit 51 which transmits driving power from a power shaft 52 to a right angular shaft 53 connected to the detachable connection 50. Operation of the driving shaft 50 functions to drive the shaft 49 at a selected rate of speed.

The frame 39 includes parallel angle members 54 and 55 which support a work table. This work table includes a generally rectangular panel 56 which overlies one side of the frame members and a table portion 57 which overlies the opposite side of the table portion. A pair of carton blank guides 59 and 60 are supported upon the table portions 56 and 57 and are laterally adjustable for accommodating carton blanks of somewhat different sizes.

The guide 59 is illustrated in section in Figure 10 of the drawings. This guide includes a horizontal portion 61 resting upon the table portion 56 and a vertical portion 62 extending upwardly from the horizontal portion 61. Upwardly and outwardly inclined flange 63 merges from the upper edge of the vertical portion 62. The inclined portion 63 tends to guide the blanks downwardly and inwardly into proper alignment with the forming plunger.

The guide 59 also includes an angle bracket 64 connected to the vertical portion 62 and having a horizontal flange extending outwardly in co-planar relation with the flange 61. This bracket 64 is designed to accommodate a clamping bolt 65 which extends through a slot 66 in the table portion 56 and also extending through a cross member 67 of the frame 39. A second mounting bracket 69 is also attached to the vertical flange 62 of the guide and is designed to accommodate a clamping bolt 70 extending through a slot 71 in the table portion 56 and through a cross member 72 of the frame.

As indicated in Figure 9 of the drawings, the inclined flange 63 extends only along the inlet portion of the guides. A horizontally extending guide plate 73 designed to overlie the carton blanks in their travel is provided with a curved inlet end 74 the shape of which is best illustrated in Figure 1 of the drawings. The carton blanks are designed to rest upon the horizontal flange 61 of the guide and to move beneath the horizontal guide plate 73.

The guide 60 is similarly shaped to the guide 59, except that the parts thereof are reversed in position. As indicated in Figure 10 the guide 60 includes a horizontal flange 75 connected to a vertical portion 76 which is bent to form an upwardly and outwardly inclined guide flange 77. Angle brackets such as 79 are designed to accommodate clamping bolts 80 which extend through transverse slots 81 in the table portion 57 and also in the cross members 67 and 72. Furthermore, as indicated in Figures 1, 9 and 10, a horizontal guide flange 82 provided with a curved entrance end 83 overlies the carton blank during its travel and holds the blank in flat condition.

A pair of chains 84 and 85 are supported by the sprockets 44 and 45 and by aligned sprockets 86 and 87 on the shaft 49. These chains are provided with spaced lugs 89 and 90 which are transversely aligned and which are designed to engage against the blanks and to move them longitudinally of the feed table. The blanks are advanced from the inlet ends of the guides 59 and 60 to the outlet end

thereof, which is indicated at the bottom of Figure 9 of the drawings.

The frame 39 includes a series of four uprights 91, 92, 93 and 94 arranged in rectangular relationship. A pair of transversely extending frame members 95 and 96 connect opposed uprights 91 and 93 and the uprights 92 and 94 respectively. A frame member 97 connects the upright 91 with the upright 92. A parallel frame member 99 connects the uprights 93 and 94. Parallel frame members 100, 101 and 102 connect the frame members 95 and 96 to form a support for the dies which act to form the carton into tray formation.

As indicated in Figure 5 of the drawings, a pair of brackets 88 and 98 extend upwardly from the frame members 100 and 99 respectively and terminate in laterally extending flange portions spaced above the level of the cross frame members just described. A pair of angular guides 103 and 104 are supported by the brackets 88 and 98 above defined so as to receive blanks advanced by the conveyor chains 84 and 85. The guide 103 includes a vertical flange 105 which registers the blank from a lateral direction. The guide 103 is provided with a pair of spaced brackets 106 and 107 which are held in place by clamping bolts 109 and 110. The clamping bolts 109 and 110 extend through laterally extending slots 111 and 112 respectively in the bracket 88 to hold the guide 103 in proper lateral position.

The guide 103 is also provided with a horizontal flange 113 on which one edge of the blank may rest when in carton forming position. The flange 113 is provided with an elongated slot 114 designed to accommodate the clamping bolt 115. The clamping bolt 115 holds an angular stop 116 in adjusted position. The stop 116 is designed to engage the leading edge of each blank in turn to register the blank with respect to the carton forming dies.

The guide 104 is similarly provided with an upright flange 117 and a horizontal flange 119 upon which the blanks may rest at the start of the carton forming operation. The guide is held in place by a pair of brackets 120 and 121 through which clamping bolts 122 and 123 extend. The clamping bolts extend through slots 124 and 125 which are arranged laterally of the bracket 98 so that the guide may be laterally adjusted. The horizontal flange 119 of the guide is slotted as indicated at 126 to accommodate the clamping bolt 127 which holds an angle bracket 129 in adjusted position. The angle bracket 129 forms a stop against which the forward edge of the blank may engage to hold the blank in registry with the forming dies. The inlet ends of the vertical flanges 105 and 117 are outwardly flared to more readily accept the blanks therebetween.

As indicated in Figure 1 of the drawings, the guide 103 is provided with an inclined bar 130 projecting inwardly therefrom. The inclined bar 130 is designed to engage above each blank and to guide the blank downwardly onto the flange 113 of the guide 103. The guide 104 is provided with similar inclined bar 131 projecting inwardly therefrom and serving a similar purpose of engaging above each blank and guiding it downwardly onto the flange 119 of the guide 104. As indicated in Figure 1 these guide bars 130 and 131 are arranged at different angles because of the irregular shape of the blank B. The bar 130 engages the projecting tab 33 of the blank which is near the center of the blank while the other bar 131 engages an ear 35 or 36. The different slant of the two bars thus guides the blank downwardly at both ends simultaneously.

As indicated in Figure 5 of the drawings a pair of angle brackets 132 and 133 are welded or otherwise secured to the angles 101 and 102 to extend inwardly therefrom. These angle brackets 132 and 133 act to support a bearing 134 which is bolted or otherwise connected thereto at 135. The bearing 134 serves to support a shaft 136. The shaft 136 is provided with a cross member 137 near

its lower extremity. A pair of springs **139** and **140** connect the cross member **137** to fixed points on the frame **39** so as to urge the shaft **136** upwardly. A collar **141** on the shaft **136** limits the upward movement of the shaft.

The shaft **136** supports a table or platform **142** at its upper extremity. This platform **142** is supported by the shaft **136** for vertical reciprocable movement. In its upper extreme position this platform **142** extends substantially flush with the horizontal flanges **113** and **119** of the guides **103** and **104**. Thus the platform serves as a support for the central portion of the carton blank as it is urged downwardly into the forming dies. Furthermore, this platform **142** elevates the formed carton above the level of the forming dies at the completion of the forming operation. The inclined chute **143** is provided on the frame **39**. As indicated in Figure 1 this chute **143** is positioned with its upper end **144** near the forming dies and slightly below the level of the table **142** in elevated position thereof. As a result the formed cartons may be urged from the table **142** down the inclined chute **143**.

With reference now to Figures 1 and 8 of the drawings, it will be noted that the upright frame members **91**, **92**, **93**, and **94** are provided with horizontally extending platform frame **145** which supports the operating mechanism for the forming machine. An operating motor **146** is provided with a base **147** which is vertically adjustably supported on guide rods **149** extending from the supporting frame **145** to a bracket **150** supported by vertical frame members **151** and **152**. The elevation of the motor **146** may be regulated by the adjustment wheel **153** which rotates a threaded shaft **154** connected to the motor base. By rotating the adjustment wheel **153** in one direction the motor **146** may be raised while rotation of this member in the opposite direction permits the motor to be lowered.

The motor **146** is provided with a motor shaft **155** provided with a pulley **156** which may be of the expandable and contractable type so as to change the ratio between the pulley **156** and an aligned pulley **157**. The pulley **157** is mounted upon the shaft **159** of a gear reduction unit **160** mounted upon the platform frame **145**. As indicated in Figure 1 of the drawings, the gear reducing unit **160** is provided with opposed outlet shafts **161** and **162**. A sprocket **163** is mounted upon the shaft **161** for rotation in unison therewith. This sprocket **163** is connected to a cooperable aligned sprocket **164** on the driving shaft **52** by a chain **165**. An idler sprocket **166** engages the chain and is adjustable in position to keep the chain **165** taut.

The gear reduction unit shaft **162** is connected to a crank shaft **167** to operate the same. The crank shaft **167** rotates a pair of counter-balanced crank arms **169** which are connected by the crank arm **170**. A connecting rod **171** is provided with a suitable bearing end **172** encircling the crank arm **170**. This connecting rod **171** is pivotally connected at **173** to a vertically reciprocable plunger **174** shown in detail in Figure 11 of the drawings. The crank shaft **167** is supported by suitable bearings **175** on the frame platform **145**.

With reference now to Figures 1 and 6 of the drawings, it will be noted that the crank shaft **167** is provided at its outer extremity with a cam **176** which rotates in unison therewith. The cam **176** is designed to actuate a valve lever **177** pivoted at **179** to the valve housing **180**. The valve **180** is designed to regulate the flow of compressed air from a supply line **181** to a blower line **182**. The blower line **182** extends downwardly along the frame and terminates in a manifold plug **183** illustrated near the right side of Figure 4 and centrally of Figure 5. This manifold plug **182** is provided with spaced air outlets **184** and **185** through which a blast of air is forced when the valve **180** is in open position. The cam **176** times the operation of the valve **180** so that the valve is open when the forming plunger has elevated out of contact with the carton and the force of the air blast blows the formed cartons from the table or platform **142** into the outlet chute **143**.

The forming plunger **174** is supported for vertical slidable movement through a bearing **186** supported by the frame **39**. The carton forming head **187** is mounted at the lower end of the plunger **174**. The head is best illustrated in Figures 7 and 11 of the drawings. In general it comprises a plug of material generally rectangular in plan and having a generally rectangular undersurface **189**. The sides of the head **187** taper upwardly and inwardly as indicated at **190** and **191** while the ends of the plunger are generally parallel as indicated at **192** and **193**. The ends **192** and **193** are centrally grooved as indicated at **194** and **195** to accommodate spring fingers **196** and **197**. These spring fingers are designed to engage against the inner surface of the carton end walls below the slots **26** and **27**, to assist in opening these slots.

As indicated in Figure 7 of the drawings, a pair of sleeves **199** and **200** extend into the head **187** on opposite sides of the plunger **174**. These sleeves are internally threaded at their upper extremity to accommodate the externally threaded ends of the plug caps **201** and **202**. A peripheral inwardly extending shoulder **203** is provided at the lower extremity of the sleeve **199** and a similar ring like shoulder **204** is provided at the lower end of the sleeve **200**. The shoulder **203** is of proper internal diameter to slidably accommodate a sleeve **205** having a closed lower end **206**. An outwardly extending flange **207** is provided at the upper end of the sleeve **205**, this flange being of proper diameter to slidably fit within the bore of the sleeve **199** above the shoulder **203**. Thus the shoulder **203** abuts against the flange **207** to restrict the downward movement of the sleeve **205**.

A similar sleeve **209** slidably fits within the shoulder **204** and is provided with an external shoulder **210** at its upper extremity which slides within the bore of the sleeve **200** above the shoulder **204**. The sleeve **209** is provided with a closed lower end **211**. A spring **212** extends between the lower end of the sleeve **205** and the plug cap **201** of the sleeve **99** to urge the sleeve **205** downwardly. A similar spring **213** is accommodated between the closed end **211** of the sleeve end **209** and the plug cap **202** to urge the sleeve **209** downwardly. Thus the sleeves **205** and **204** normally project below the undersurface **189** of the forming head **187**, but may be retracted completely into the head.

The forming dies which actually form the carton into tray shape are best illustrated in Figures 4 and 5 of the drawings. These dies are formed in two general parts **214** and **215**. These die parts are similarly formed and are arranged in opposite relationship. The die part **214** includes a wall engaging portion **216** designed to engage the rear wall of the carton and locking tab folding elements connected thereto and indicated in general by the numerals **217** and **219**. The wall engaging portion **216** is provided with a tapered upper extremity **220** which tends to guide the rear wall into upright position. The die portion **216** is adjustably supported upon an L-shaped bracket **221** by adjusting screws **222**. The L-shaped bracket is mounted upon a pivot shaft **223** supported by spaced bearings **224**. A pin **225** is supported by the pivot shaft **223** and is urged by a spring **226** in a counter-clockwise direction as viewed in Figure 5. The L-shaped bracket **221** is so shaped as to be limited in its pivotal movement, the position indicated in Figure 5 being one extreme position. The L-shaped bracket **221** is provided with a lateral extension **227** which extends in the path of movement of the table **142**. Thus as the table **142** is pressed downwardly by the forming plunger **187** the L-shaped brackets **221** will pivot in a counter-clockwise direction to a limited extent, swinging the vertical face **229** of the forming member **216** past vertical position.

The die portion **215** also includes an inclined entrance portion **230** and an upright portion **231** designed to engage against the front wall of the carton. The member

119 is adjustably secured to an L-shaped bracket 232 by adjusting screws 233. The L-shaped bracket 232 is mounted upon a pivot shaft 234 supported by spaced bearings 235. A pin 236 on the pivot shaft 234 is urged in one rotative direction by a spring 237. Thus the die part 119 is normally held in the position illustrated in Figure 5 with the upright surface 231 on a plane angled to one side of vertical. The L-shaped bracket 232 extends in the path of movement of the table 142 so that as this table is lowered it engages the extension 239 of the L-shaped bracket and swings the upright surface 231 through a vertical plane and into an upwardly and inwardly inclined position. In other words, both of the forming parts swing past vertical position to swing the front and rear walls of the carton beyond vertical position to insure the engagement of the various locking tabs with their locks.

The operation of the apparatus is as follows:

When the motor 146 is in operation, the motor acts through the belt 240 to rotate the gear reduction unit 160 which in turn drives the shafts 161 and 162. Rotative movement is transmitted through the sprockets 163 and 164 by the chain 165 to drive the shaft 52. As indicated in Figure 4 of the drawings, rotative movement of the shaft 52 acts through the gear unit 51 to rotate the shaft 50 which supports sprockets 86 and 87 supporting the chains 84 and 85. The chains are thus actuated so that the chain lugs 89 and 90 move toward the forming station.

The operator strips blanks B from a stack of blanks and places each blank upon the conveyor chains 84 and 85 between the guides 59 and 60. The blanks are engaged by an opposed pair of lugs 89 and 90 and moved along the conveyor toward the forming station. As the blanks reach the end of the conveyor nearest the forming plunger, they extend beyond the end of the conveyor and are directed downwardly by the inclined bars 130 and 131. In other words, the conveyor pushes each blank beyond the end of the conveyor and against fixed stops 116 and 129 on the lateral guides 103 and 104.

During this operation, the rear edges of each blank are mechanically forced downwardly by the lugs 89 and 90. These lugs maintain engagement with the rear edge of the sheet until the sheet drops below the limit of movement of the lugs. Thus while the forward edge of each sheet is guided downwardly by the inclined bars 130 and 131, the rear edges of the blanks are engaged and forced downwardly by these same bars.

The blank advanced by the conveyor is then overlying the table 142 and is held in proper relation to the table by the side guides 103 and 104 and by the end guides 116 and 129. The machine is timed so that the plunger will next descend upon the blank.

The gear reduction unit acts through the crank shaft 167 to lower the plunger, the downwardly projecting sleeves 205 and 209 first engaging the blank and holding the blank in fixed position relative to the table 142. The sleeves 205 and 209 telescope into the forming head 187 as the head moves downwardly as the sleeve projecting springs 212 and 213 are lighter than the springs 139 and 140 holding the table in elevated position. When the undersurface 189 of the forming head engages against the carton blank, it substantially registers with the bottom wall 10 of the blank and is virtually the size of this blank.

The carton thus engaged is urged downwardly, the end walls 20 and 21 of the carton engaging the end folding elements 217 and 219 of the die portion 214 and the end folding portions 241 and 242 of the die portion 215. These same end folding elements also act to hold the locking tabs of the carton blank outwardly of the end walls 20 and 21 and are so shaped as to direct these locking tabs into the slots 26 and 27 of the carton end walls.

As the carton moves downwardly the rear and front walls of the cartons are folded upwardly by the folding elements 216 and its opposite folding member 243. As the table 142 engages the L-shaped brackets 221 and 232, these wall engaging elements 216 and 243 are pivoted past vertical position to toe the front and rear walls of the carton inwardly and to insure the engagement of the locking tabs with their respective slots.

As indicated in Figure 12 of the drawings, the member 243 of the die portion 215 is provided with a crimping die 244 which engages in the portion of the front wall 14 of the blank defined by the locking tab 34. This crimping die serves to bend the locking tab 34 inwardly out of the normal plane of the carton front wall, thus insuring the easy entry of the locking tab 33 when the carton is closed.

Upon continued rotation of the crank shaft 167 the plunger 174 raises the forming head 187 until the table 142 reaches its upper extreme position. The forming head 187 continues to rise and the sleeves 205 and 209 hold the carton bottom wall 10 against the table 142 until the head 187 is free from the carton walls. As soon as the head 187 is raised sufficiently the cam 176 operates the air valve 180 to direct a blast of air through the ports 184 and 185 against the formed carton, blowing the carton from the table 142 and onto the chute 143 where it slides by gravity to a suitable recepetacle or to a suitable conveyor for conveying the cartons from the forming machine.

In accordance with the patent statutes, the principles of construction and operation of the carton forming apparatus have been described, and while it is desired to set forth the best embodiment thereof, it is desired to have it understood that obvious changes may be made within the scope of the following claims without departing from the spirit of the invention.

We claim:

1. A carton forming device including carton forming dies, plunger means for urging a carton blank between said dies for forming the same, said plunger being vertically receiprocable toward and away from said dies, a generally horizontal conveyor terminating laterally of said dies, said conveyor including spaced means engageable with carton blanks for urging the blanks toward said dies, inclined guide means engageable with the leading edge of the carton blanks for directing the blanks forwardly and downwardly by gravity toward said dies, said spaced means on said conveyor engaging the trailing edge of each blank for urging the same downwardly against said dies.

2. The structure described in claim 1 and including means for actuating said plunger and said conveyor in timed relation to urge each blank between the plunger means and the dies while the plunger means is in elevated position.

3. The structure described in claim 1 and including means for ejecting the formed cartons from said dies.

4. The structure described in claim 1 and including means for elevating the formed cartons above said dies.

5. The structure described in claim 1 and including means for elevating the formed cartons above said dies, and means ejecting the elevated cartons from said carton elevating means.

6. A carton forming apparatus including carton forming dies, reciprocably mounted plunger means cooperable with said dies and reciprocable into and out of said dies, a conveyor comprising endless conveyor means terminating in laterally spaced relation to said dies and plunger means, said endless conveyor means having spaced carton blank engaging elements thereon for engaging the carton blank beyond the end of said conveyor and guiding the blank into position between the dies and said plunger means, rotatable means arranged on a substantially horizontal axis over which the conveyor means extends to form the conveyor end, and drive means for said plunger means and said conveyor operable to advance a carton

blank on said conveyor between the dies and the plunger means when the plunger means is spaced away from the dies, said conveyor terminating short of said dies, and an inclined guide engaging each blank for downward movement by gravity into registry with said dies, the carton blank engaging means on said conveyor means exerting a downward force on the rear end of the carton blank as the conveyor means passes over said rotatable means.

7. A carton forming apparatus including carton forming dies, reciprocably mounted plunger means cooperable with said dies and reciprocable into and out of said dies, a conveyor comprising endless conveyor means terminating in laterally spaced relation to said dies and plunger means, said endless conveyor means having spaced carton blank engaging elements thereon for engaging the carton blank beyond the end of said conveyor and guiding the blank into position between the dies and said plunger means, rotatable means arranged on a substantially horizontal axis over which the conveyor means extends to form the conveyor end, and drive means for

said plunger means and said conveyor operable to advance a carton blank on said conveyor between the dies and the plunger means when the plunger means is spaced away from the dies, said conveyor terminating short of said dies, the carton blank engaging means on said conveyor means exerting a downward force on the rear end of the carton blank as the conveyor means passes over said rotatable means.

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