Feb. 23, 1937. A. E. BROWN ET AL 2,072,065

CARTON ERECTING MACHINE

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Fig. 1

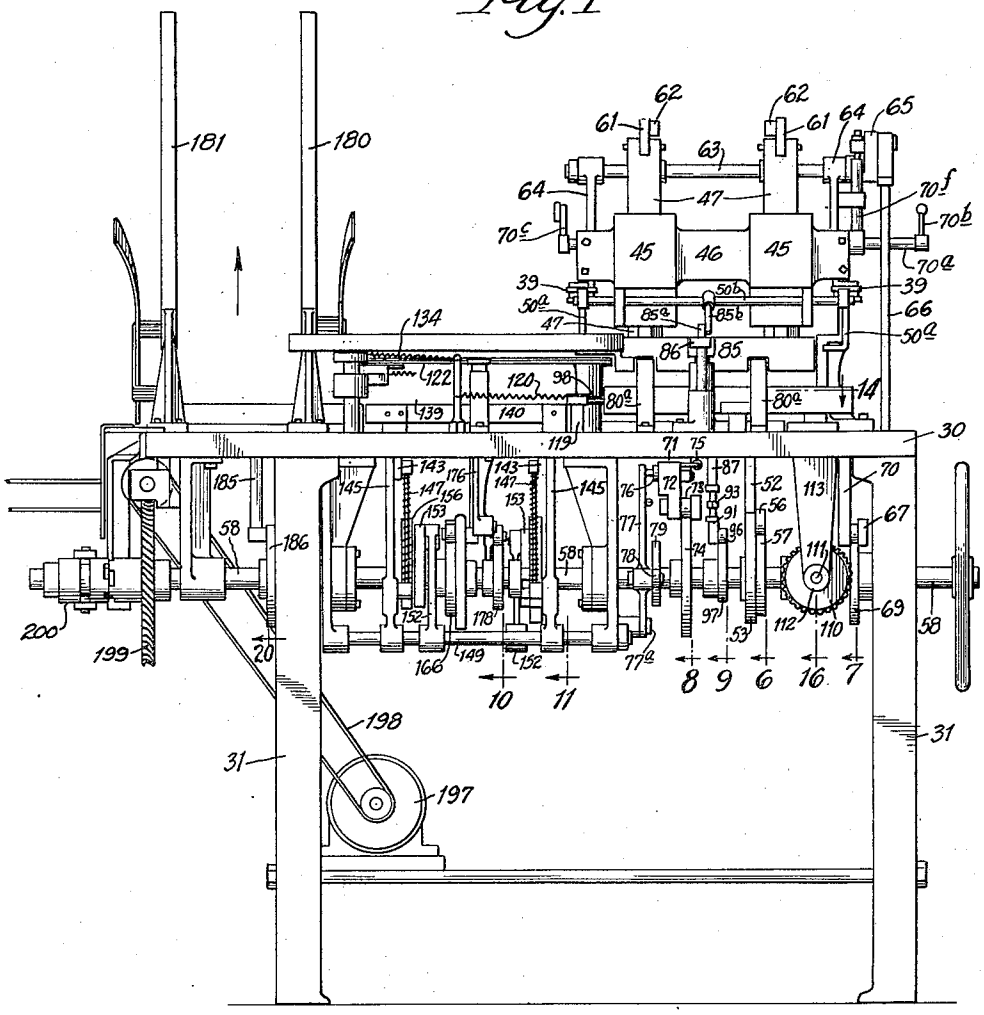


Fig. 4

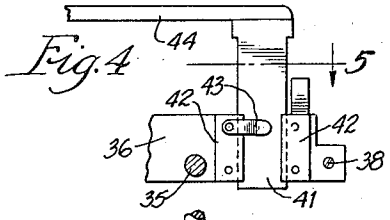
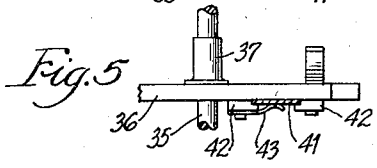


Fig. 5



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Fig. 2

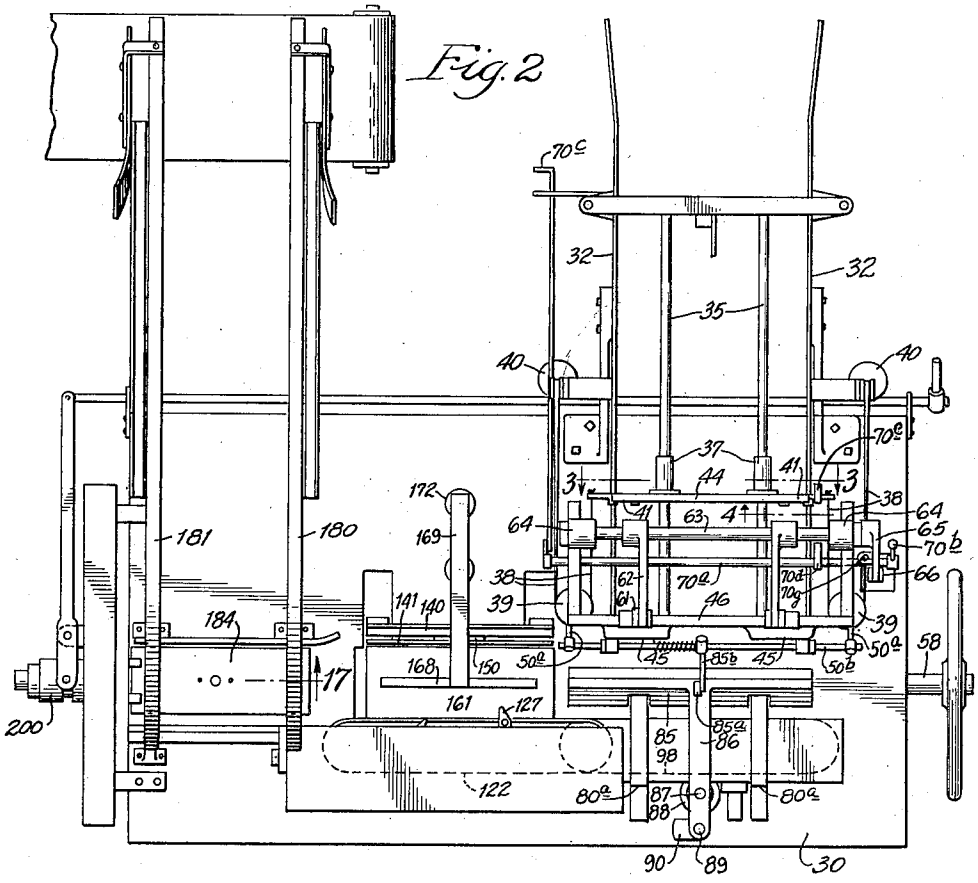
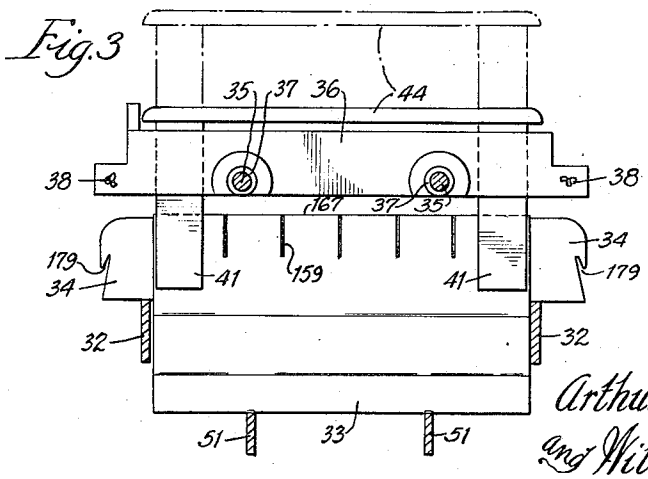


Fig. 3



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Fig. 6

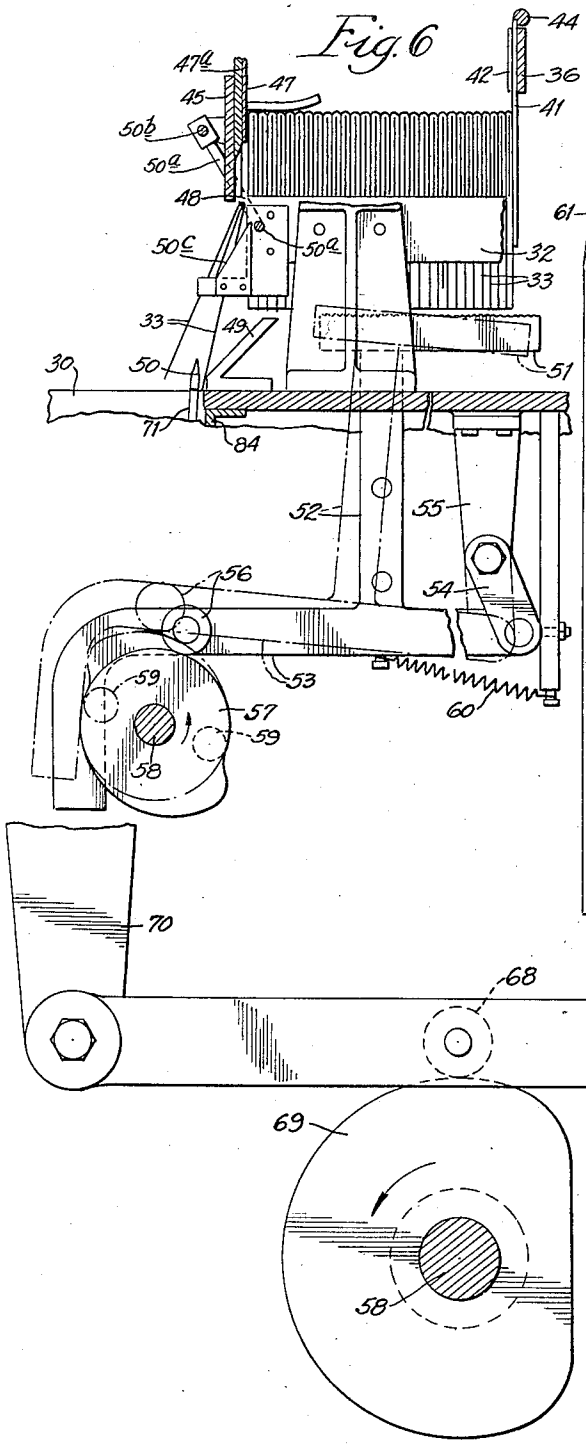
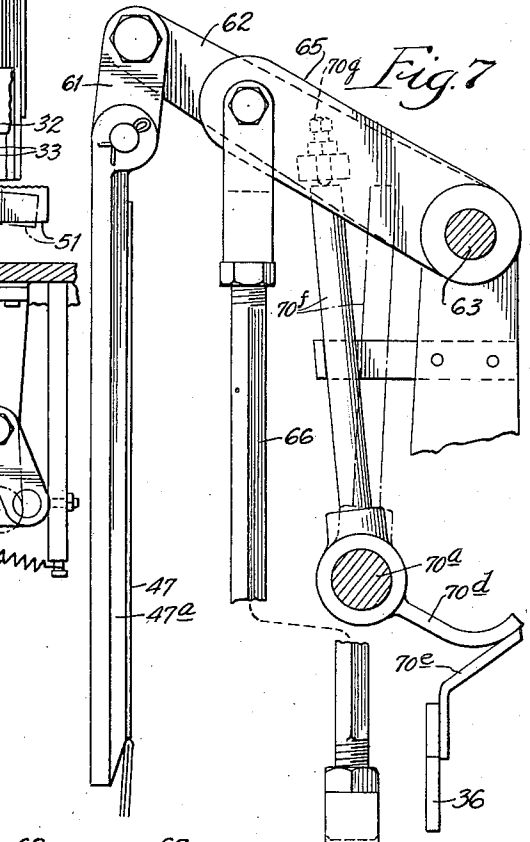


Fig. 7



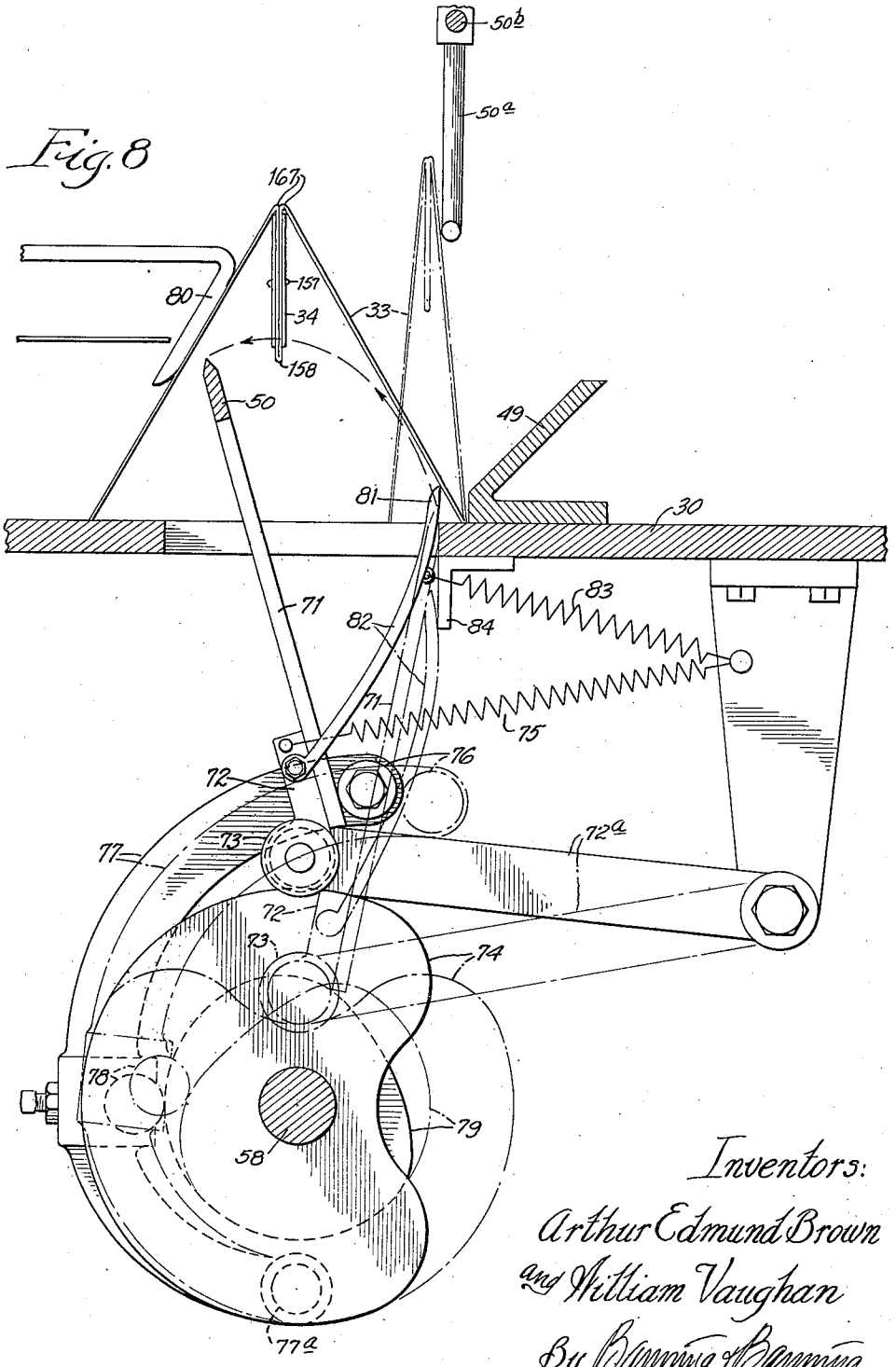
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Fig. 8



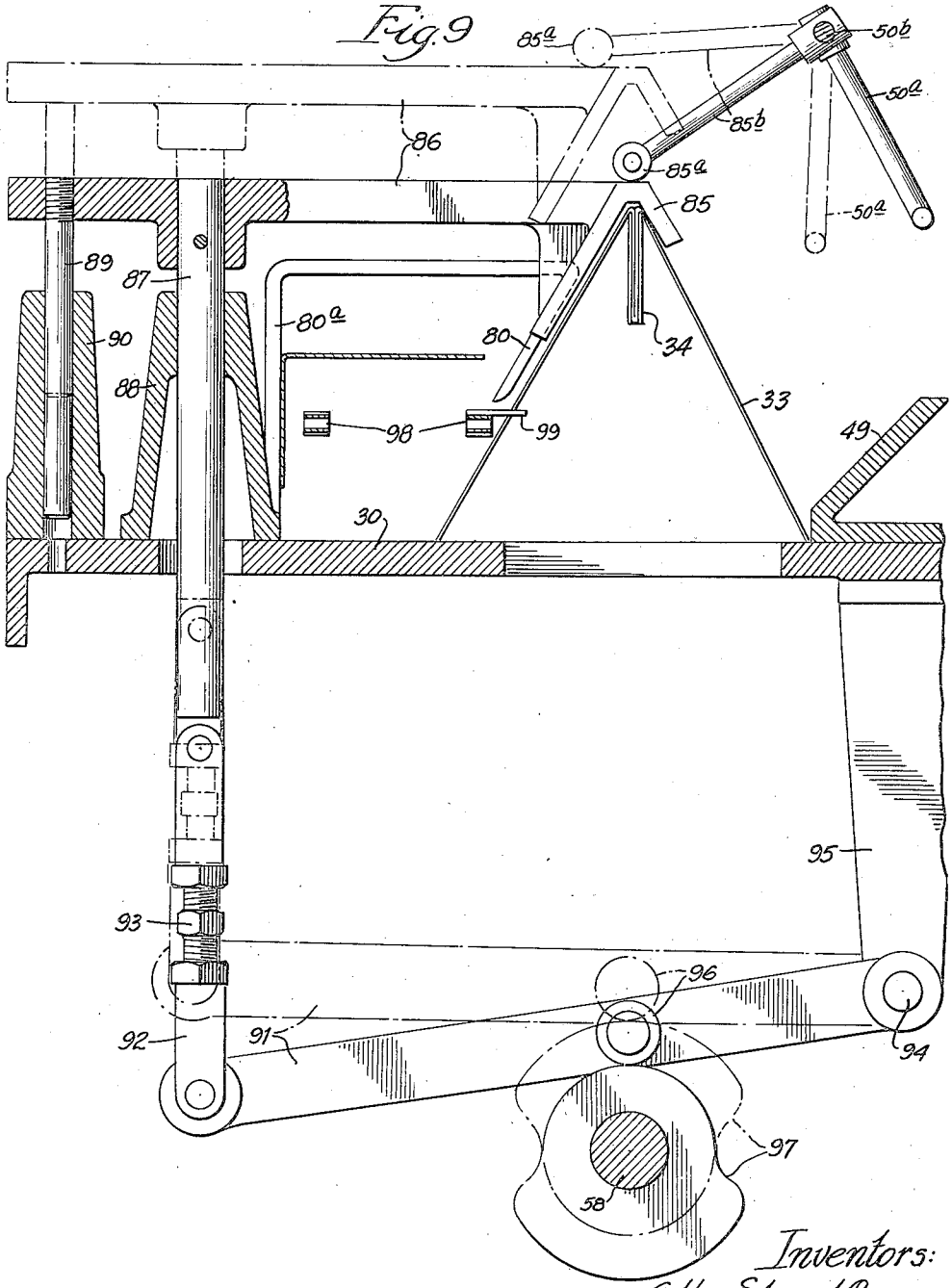
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Fig. 9



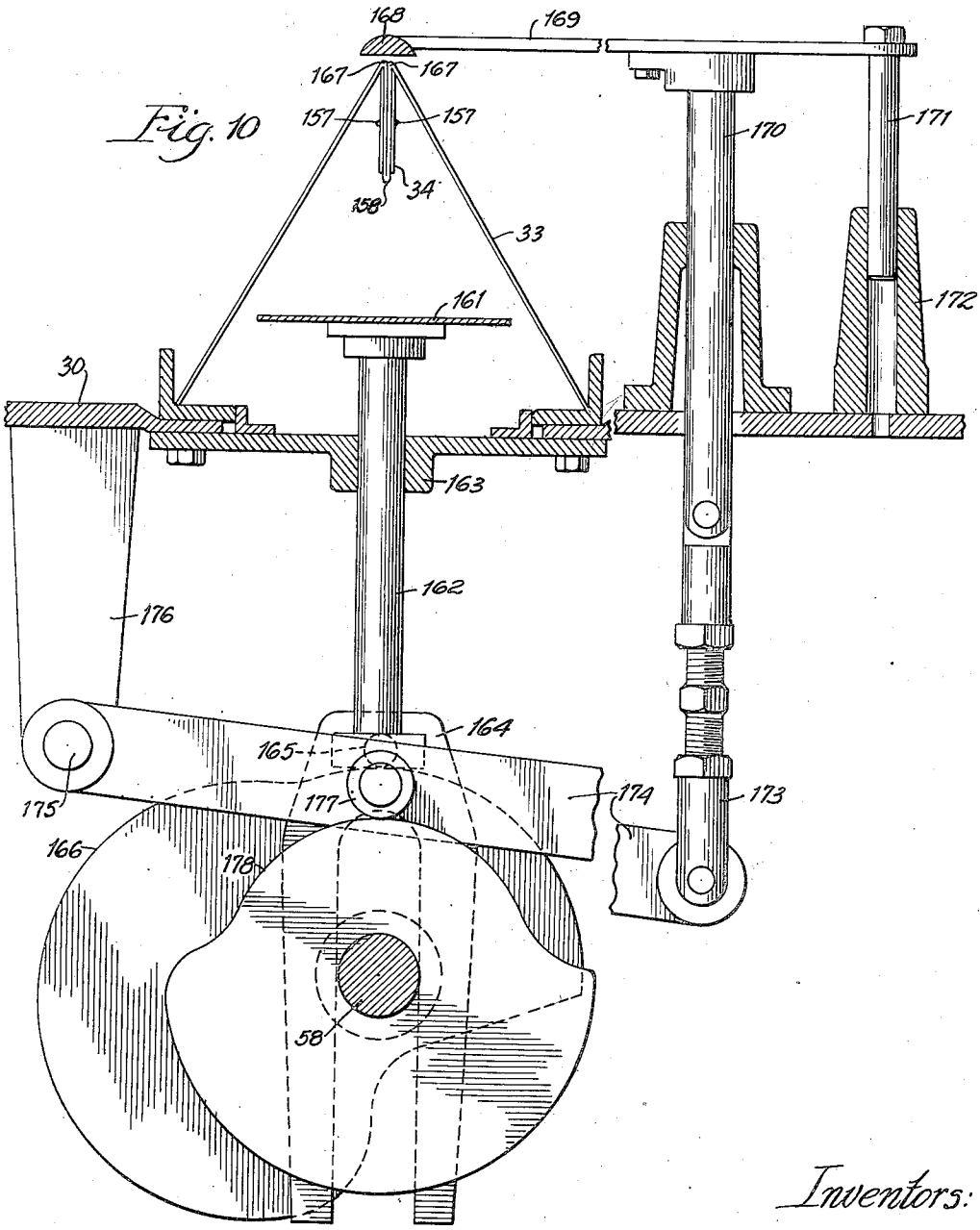
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Fig. 10



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Fig. 11

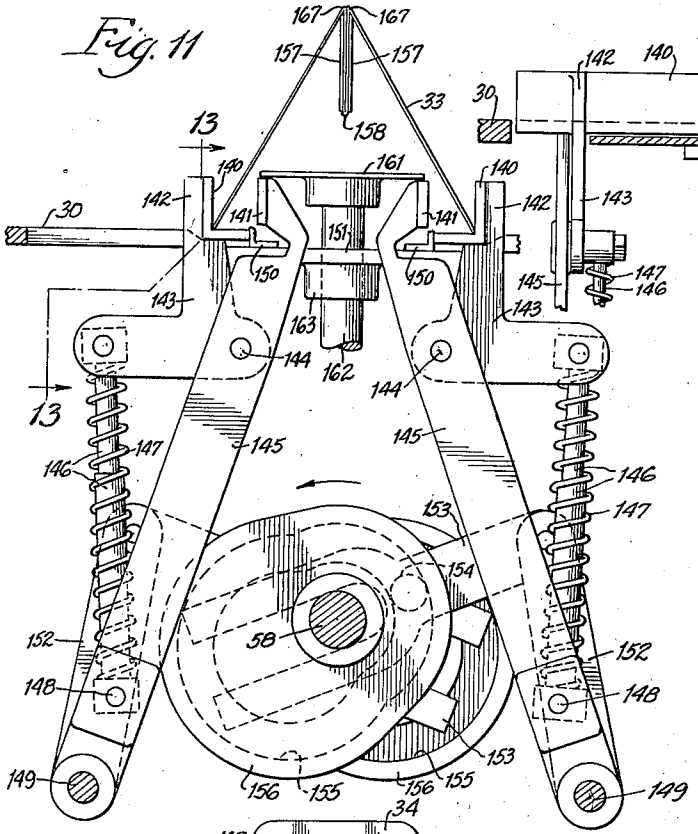


Fig. 13

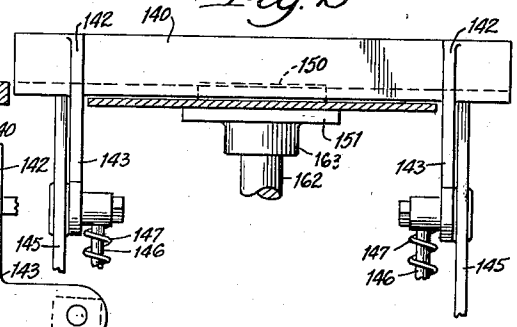
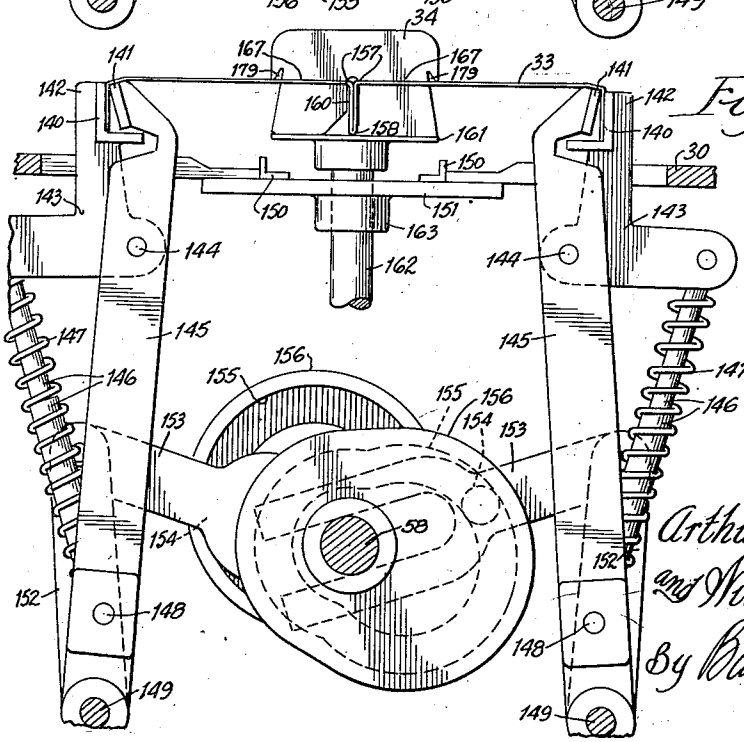


Fig. 12



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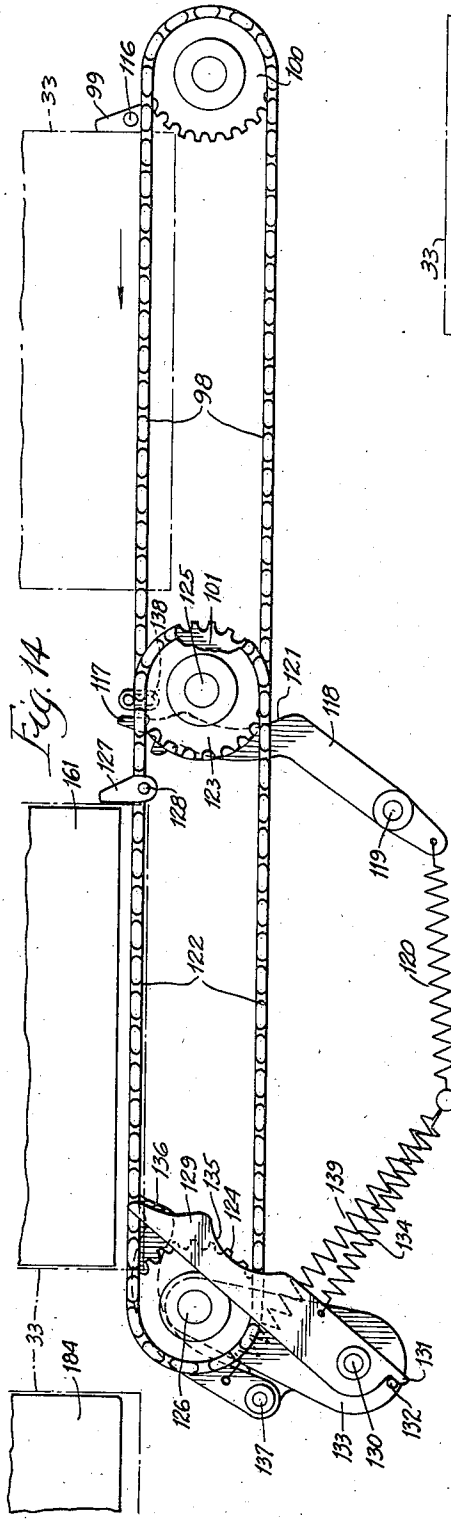


Fig. 14

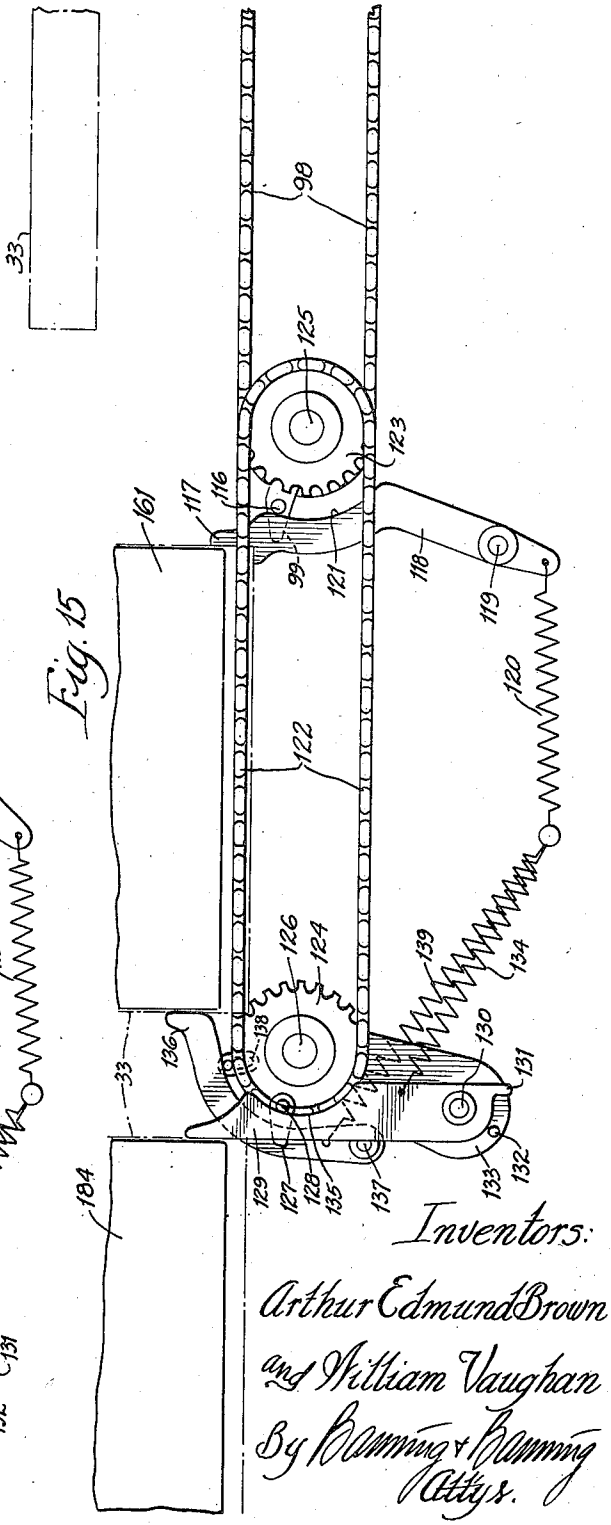


Fig. 15

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Fig. 17

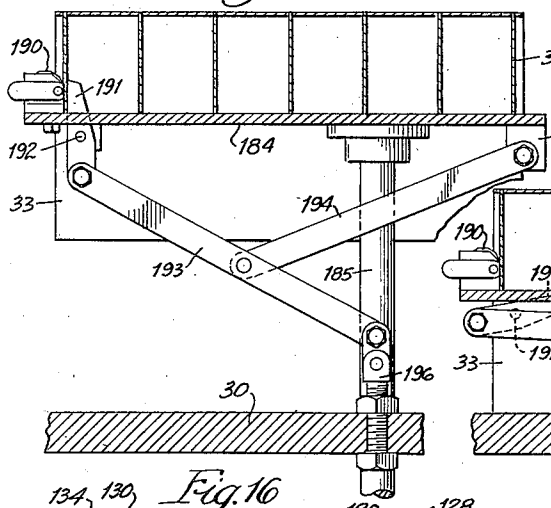


Fig. 18

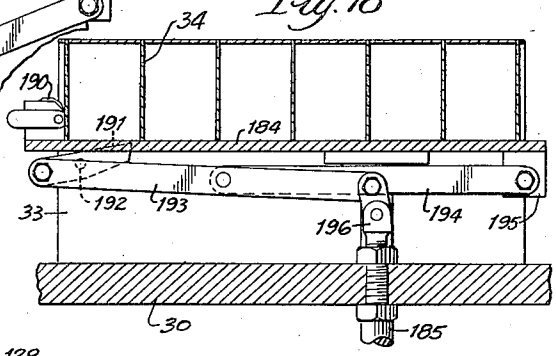


Fig. 16

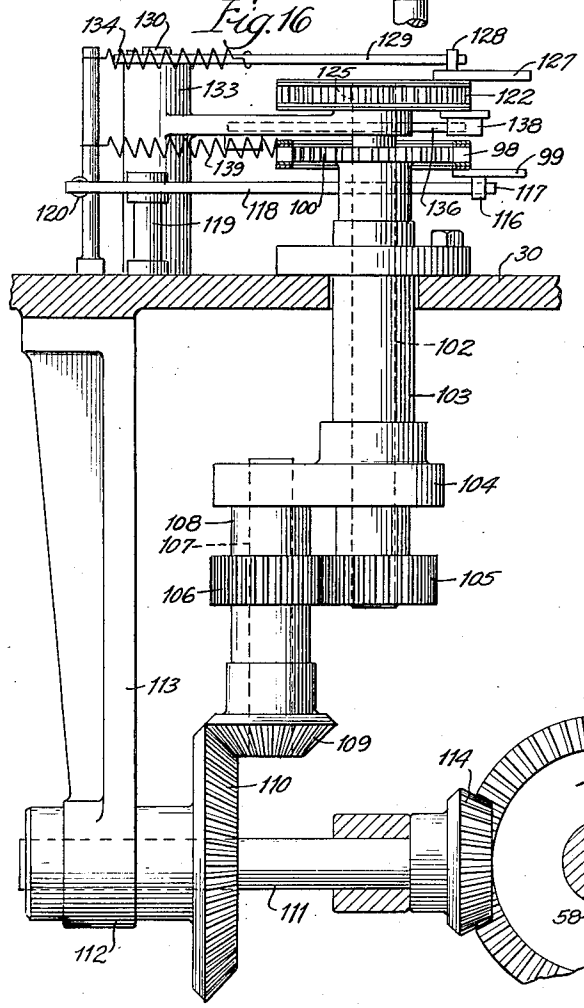
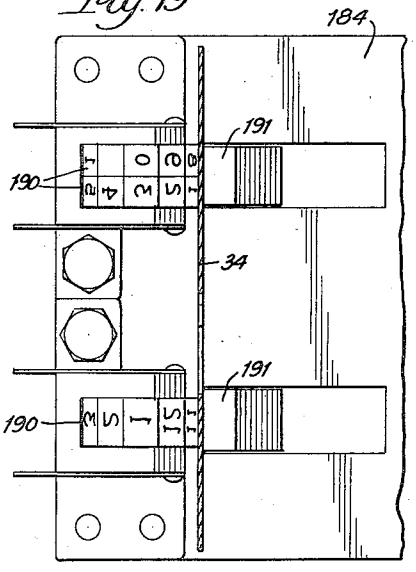


Fig. 19



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Fig. 20

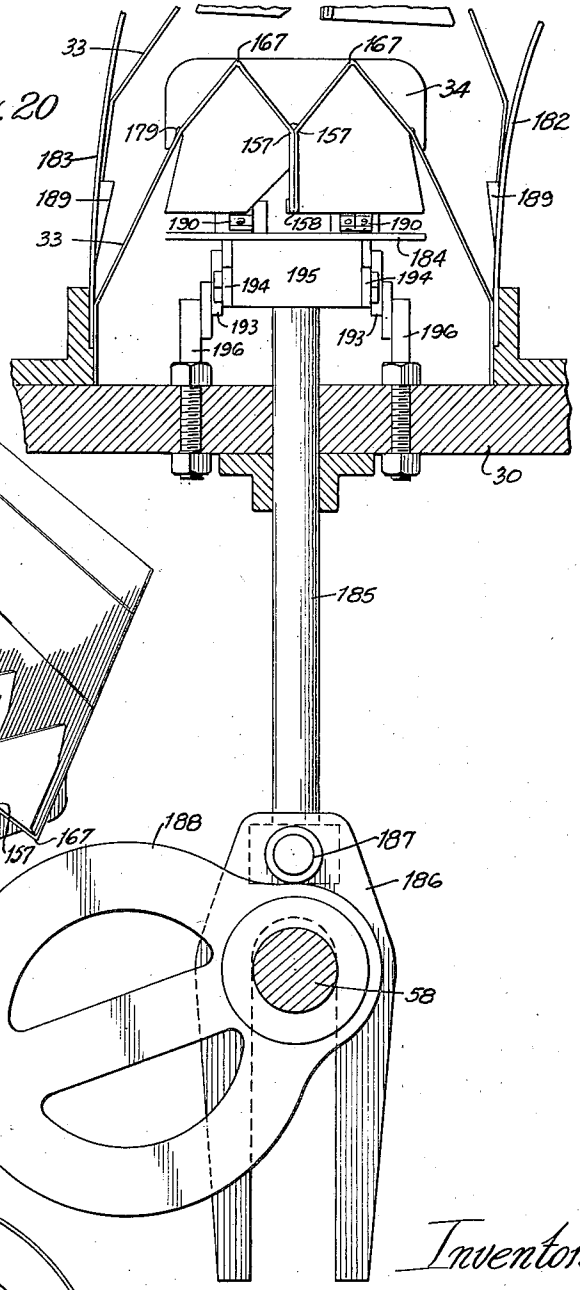


Fig. 21

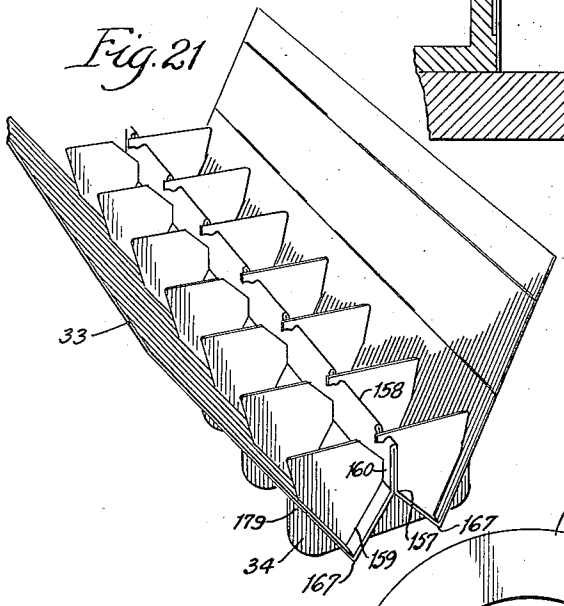
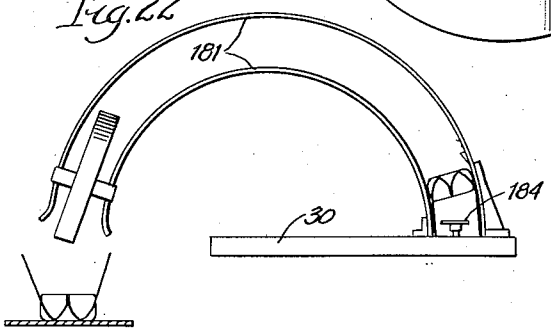


Fig. 22



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Patented Feb. 23, 1937

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UNITED STATES PATENT OFFICE

2,072,065

CARTON ERECTING MACHINE

Arthur Edmund Brown and William Vaughan, London, Ontario, Canada, assignors to Leon Benoit, New York, N. Y.

Application December 9, 1935, Serial No. 53,540

35 Claims. (Cl. 93—37)

The machine of the present invention is designed primarily for use in the erection of egg cartons provided with cells or compartments for the retention of the eggs. Such cartons are shipped in flatwise or knockdown condition with the crosswise partition walls bent into longitudinal relation with the carton body walls, and in order to set up or erect the carton it becomes necessary to spread or distend the walls and to swing the cross walls into transverse relation thereto, and to effect an interlock between the cross walls and the body walls so as to retain the carton in its erected condition in preparation for the introduction of the eggs.

The cartons for the erection of which the machine of the present invention is primarily designed are of the character known as multi-piece cartons, each consisting of integrally formed body walls which are slotted to receive the separately formed cross partition walls which divide the cartons into a plurality of cells adapted to receive the eggs. In cartons of this character, the carton wall blank is folded in such a way that when erected it will provide a longitudinally extending folded center partition with trough shaped channels on either side thereof, through which the cross walls extend and are held in interlocked relation with the body walls, which latter are scored to afford the necessary sides and cover which are folded around and over the carton to complete the enclosure. In the flatwise or knockdown condition, the cross walls are hingedly engaged with the longitudinally folded center partition and are swung to lie flatwise upon one another and between the flat lying carton walls, with the terminal cross walls projecting beyond the ends of the flat lying carton walls, and the present machine is designed to feed flat lying knockdown cartons of this character from a stack in which the cartons stand in inverted edgewise relation to maintain the inverted relation throughout the several feeding and erecting operations and to ultimately reverse the cartons after erection so that they will be discharged right side up at the delivery end of the machine.

The present invention is designed to automatically feed forward cartons singly from the stack in a manner to effect a preliminary opening up of the carton walls in preparation for the ultimate distention of the carton and the opening out of the cross walls into transverse relation. After the preliminary opening movement, the cartons are fed to a position where the carton walls are engaged by grippers which effect a positive distention sufficient in degree to cause the cross partition walls to swing transversely as incidental to the opening out of the carton and without the provision of mechanical means acting directly and positively upon the cross walls themselves, which constitutes a special or distinctive feature in the operation of the present machine, which distinguishes it in principle from any others with which we are familiar. After the distention of the carton walls to the degree required to swing the cross walls transversely and effect an interlock with the carton walls, the operation is completed by relative movement of the parts in sufficient degree to carry the body walls completely around the sides of the cross walls and thereby complete the erecting operation, after which the erected carton is automatically delivered to a stack of erected cartons which are discharged from the machine right side up and in condition for packing.

The present invention is directed to the means for initially opening up the carton walls; to the gripper mechanisms and associated mechanisms for ultimately distending the carton walls and incidentally swinging the cross walls into transverse interlocked relation; to the mechanism for automatically feeding the cartons from stage to stage through the machine, and for finally delivering the erected cartons from the machine; to the means provided for timing and regulating the respective movements involved in the advance and distention of the cartons, and to the machine as a whole and the individual portions thereof.

In the drawings:

Figure 1 is a side elevation of the machine as a whole;

Fig. 2 is a plan view of the same;

Fig. 3 is an enlarged sectional elevation, taken on line 3—3 of Fig. 2, showing the manner of stacking the knocked down cartons within the hopper;

Fig. 4 is a detail of the follower plate for advancing the stack of knocked down cartons;

Fig. 5 is a section taken on line 5 of Fig. 4;

Fig. 6 is a section taken on line 6 of Fig. 1, showing the delivery of cartons singly from the stack;

Fig. 7 is a detail taken on line 7 of Fig. 1, showing the feeding plate for the stacked cartons, with the cam and connections for operating the same;

Fig. 8 is an enlarged view taken on line 8 of Fig. 1, showing the mechanisms for preliminarily opening the cartons after delivery from the stack;

Fig. 9 is a similar view taken on line 9 of Fig. 1, showing additional mechanisms involved in the preliminary opening of the cartons;

Fig. 10 is a view taken on line 10 of Fig. 1, showing the preliminarily distened carton standing in position to be engaged by and further distended by the action of the grippers, together with mechanisms involved in these operations;

Figs. 11 and 12 are two views taken on line 11 of Fig. 1, showing the gripper mechanism and associated parts in different positions during the cycle of operation;

Fig. 13 is a sectional detail taken on line 13 of Fig. 11;

Fig. 14 is a plan view taken on line 14 of Fig. 1, showing the carton feeding chains and associated parts;

Fig. 15 is a similar view showing said mechanisms in a different position of operation;

Fig. 16 is a view taken on line 16 of Fig. 1, illustrating the feeding chains with the driving connections therefor;

Figs. 17, 18 and 19 are details showing the means provided for stamping or embossing the cartons with a date or other identifying insignia;

Fig. 20 is a view taken on line 20 of Fig. 1, showing the means provided for stacking the erected cartons and delivering them from the machine;

Fig. 21 is a perspective view illustrating an erected carton of the type which the present invention is designed to erect; and

Fig. 22 is a diagrammatic view showing the configuration of the discharge chute for reversing the cartons from the inverted position and delivering them right side up from the machine.

The machine as a whole is carried by a table or platform 30 mounted upon legs or standards 31. At the right side of the table as viewed in Fig. 1, the cartons in collapsed condition are stacked edgewise within an open hopper, which comprises a pair of horizontal side bars 32 which, as shown in Fig. 3, are spaced sufficiently to permit the body walls 33 of the collapsed carton to hang downwardly between the bars, whose upper edges afford support for the projecting cross partitions 34 which, in the position shown, lie flatwise and in overlapped relation to one another between the flattened side walls of the carton. The cartons are thus suspended and in position to travel forwardly along the bars 32, but are not otherwise supported.

Between the bars 32 and above the level of the cartons are located a pair of spaced parallel guide rods 35 which afford a trackway for a sliding follower bridge bar 36 provided with sleeves or bushings 37 which embrace the guide rods 35. The bridge bar is urged forwardly by cables 38 connected to the ends of the bar, which cables are carried around rollers 39—39 and connect with counterweights 40—40. The bridge bar 36 occupies a position above the level of the stacked cartons and furnishes a support for a pair of vertically sliding follower blades 41—41, each of which is mounted between undercut guide blocks 42 and frictionally held in adjusted position by a spring clip 43. The two follower blades are connected by a bridge rod 44, so that they may be raised and lowered in unison, and when lowered will occupy a position to the rear of the stack of cartons, as shown in Fig. 3, but may be lifted to the dotted line position shown in that figure when it becomes necessary to replenish the stack of cartons from the rear.

Carton feeding mechanism

As shown in Fig. 6, the foremost carton of the stack contacts against a pair of vertically disposed stop plates 45—45, which form part of a front casting and are connected by a cross web 46 (Fig. 1) suitably supported from the frame of the machine. Behind the top plates 45 are located a pair of vertically disposed thin plunger plates 47—47 carried by plunger bars 47a, which are guided to reciprocate along the inner surface of the stop plates and in position to bring the thin plunger plates 47 into register with the upper folded edge of the foremost collapsed carton and discharge the same downwardly, as in Fig. 6. This is permitted by reason of the fact that the forward ends of the hopper bars 32 terminate slightly to the rear of the acting face of the stop plates 45 to afford a clearance 48 for the foremost carton, which is thus held by friction only and in position to be acted upon by the descending plunger plates 47. As the foremost carton is ejected, its rear wall will engage an obliquely disposed guide plate 49 which directs the edge of the rear carton wall into the space adjacent a swinging bar 50, which at this instant occupies the retracted position shown in Fig. 6. The folded top of the carton is swung outwardly by a finger 50a mounted on a rock shaft 50b, while the projecting cross walls slide upon inclined plates 50c, which guiding of the carton causes it to slide outwardly and assume the upright position shown in dotted lines in Fig. 8.

In order to assist the forward advance of the stacked cartons, a pair of serrated fanning blades 51 are provided (Figs. 3 and 6), which blades are positioned to fan against the lower edges of the stacked cartons by a four-way brushing movement. As shown in Fig. 6, each of the blades 51 is carried by a vertical standard 52 upstanding from a hooked arm 53 having its rear end pivoted to a link 54, which in turn is pivoted to a bracket 55. The forward end of the arm 53 is hooked downwardly, and the arm is provided with a roller 56 which rides upon the rim of a cam 57 mounted upon a cam shaft 58, which cam also carries a lug or roller 59 adapted to engage the hooked forward end of the arm 53. As rotation occurs, the arm will be recurrently lifted and drawn forwardly, and thereafter lowered and returned under the tension of a spring 60, so that a fanning or brushing movement will be imparted by the blades 51 to the stacked cartons.

The movements of the plungers 47 are effected through connections each comprising a link 61 pivoted to the forward end of an oscillating arm 62 carried by a rock shaft 63 journalled within the upper ends of standards 64, which also carry the ends of the stop plates 45. The rock shaft 63 is provided with a crank arm 65 to which is pivoted a vertical oscillating rod 66 having its lower end pivoted to an arm 67 provided with a roller 68 which rides upon a cam 69 mounted upon the cam shaft 58, the forward end of the arm 67 being pivoted to a bracket 70, so that the shaft 63 will be rocked in timed relation to operate the plungers. The operation of the plungers may be disabled by the rocking of a shaft 70a having hand controls 70b and 70c and an automatic control 70d in the form of a foot adapted to be contacted by a finger 70e on the follower bridge bar 36 which advances with the depletion of the stack. The rocking of the shaft 70a swings a disabling

finger 70f under a stop pin 70g on the oscillating arm 65, so that the plungers will hang suspended and cease to follow the cam 69, thus suspending the feeding of cartons for replenishment of the stack or for other reasons as occasion may require. The hand control levers enable the operator to instantly disable the feeding from either of two positions without otherwise stopping the operation of the machine.

Preliminary distending mechanism

With the lower edge of the rear wall of the carton abutting against the swinging bar 50, and with the lower edge of the forward carton wall in advance of the bar, the carton rests upon the table 30 in position to be distended to the position shown in Fig. 8. The swinging bar 50 is carried by a swinging arm 71, which at its lower end is secured to a block 72 pivoted at the end of a lever 72a, which carries a roller 73 riding upon the rim of a cam 74 mounted upon the cam shaft 58. Fig. 8 in dotted lines shows the position of the swinging bar 50 and associated cam at the beginning of the distending stroke, and in full lines shows the position assumed at the conclusion of the stroke. The swinging arm works against the tension of a spring 75, and its in and out movements are effectuated by the contact of a roller 76 which rides upon the inner surface of the swinging arm 71 and is carried at the upper end of an arcuate lever 77 pivoted at 77a and having a roller 78 which rides upon the rim of a cam 79 mounted upon the cam shaft. The configuration of the cams 74 and 79 is such as to give to the swinging bar 50 a resultant swinging and lifting movement indicated by dotted lines, so that, during the cycle of operations, the forward wall of the carton will be distended to the position indicated in Fig. 8, at which point it will contact with obliquely disposed stops 80 carried by upstanding arms 80a secured to the table.

In order to retain the rear carton wall in position during distention of the forward wall, a stop bar 81 is provided, which is carried by an arm 82 pivoted at its lower end to the block 72, and held under tension by a spring 83. The stop bar rides against the forward face of a flange 84, the relationship of the parts being such that the stop bar, during the cycle of operations, will move from the lowered position indicated in dotted lines to the uppermost position concurrently with the swinging forward of the bar 50, so that, as the bar 50 swings away from its contact with the rear wall of the carton, the stop bar 81 will take its place, thereby restraining the rear wall of the carton during the distending operation.

As the carton is being distended, its upper ridge is overhung by a steadying bar 85 of inverted V-shape (Fig. 9) carried by a horizontal arm 86 mounted upon a reciprocating rod 87 guided within a block 88 mounted upon the table. The rear end of the arm 86 is steadied by a depending guide rod 89 sliding within a bored stud 90. Vertical movements are imparted to the rod 87 by means of an arm 91 connected by linkage 92 with the lower end of the rod 87, an adjusting screw 93 being provided to regulate the length of the linkage. The arm 91 has its rear end mounted upon a pivot pin 94 at the lower end of a depending bracket 95, and the arm is provided with a roller 96 which rides upon the rim of a cam 97 on the cam shaft 58. The relationship of the parts is such that during the major portion of the distending operation the grooved steadying bar will be elevated sufficiently to permit the upper ridge of the distending carton to clear the edge of the steadying bar, but thereafter the steadying bar will descend to overlie the ridge of the carton and hold it properly aligned in preparation for its advance along the table to its next position, where the gripping mechanisms serve to complete the distention.

The bar 85 serves to rock the shaft 50b by contact with a roller 85a on the end of an arm 85b projecting from the shaft.

Carton advancing mechanism

The carton, when distended as in Fig. 9, will have its forward wall in adjacent relation to the inner turn of an endless feeding chain 98 (see Figs. 14 and 15), which is provided with an inwardly extending finger 99 adapted to engage the rear edge of the forward wall of the carton and advance the carton along the table to the position indicated in Figs. 10, 11 and 20. The chain 98 is carried around sprockets 100 and 101 (see Fig. 14). The sprocket 100 is the driving sprocket and is keyed upon a vertical shaft 102 journalled within a journal sleeve 103 having a journal head 104 at its lower end. The shaft 102 at its lower end is provided with a driven pinion 105 meshing with a driving pinion 106 on a stub shaft 107 journalled through a boss 108 depending from the journal head 104. The stub shaft at its lower end carries a bevel pinion 109 meshing with a driving bevel pinion 110 on a horizontal stub shaft 111 journalled within a journal head 112 at the lower end of a depending bracket 113. The shaft 111 carries a bevel pinion 114 meshing with a bevel gear 115 on the cam shaft 58.

The finger 99 carries an upstanding pin 116, which, as it advances to the sprocket 101, will engage the tip 117 of a kicker finger 118 which is pivoted upon a vertical pivot 119, the tail end of the finger being engaged by a spring 120. The forward edge 121 of the finger is of arcuate formation to permit the pin 116 to ride past the kicker finger 118, the parts being so related that a carton carried forward by contact of the finger 99 will be given a final impulsion or kick by the finger 117 after the finger 99 has swung around the sprocket 101 and has thus released itself from contact with the carton, the kicker finger adding the final impetus necessary to deliver the carton to the intended position.

The feeding chain 98 is aligned with a second feeding chain 122 which is carried upon sprockets 123 and 124. The sprocket 123 occupies a position immediately above the sprocket 101, which sprocket is thus concealed in Figs. 14 and 15. The sprockets 101 and 123 are both mounted upon a sprocket shaft 125, and the sprocket 124 is mounted upon a sprocket shaft 126. The chain 122 carries a feeding finger 127 similar to the finger 99 which, upon the inner turn of the chain, will engage the rear edge of the carton wall for the final feeding movement to be presently described more in detail.

The finger 127 is provided with an upstanding pin 128 which is positioned to engage a kicker 129 mounted upon a pivot pin 130 and provided with a tail 131 adapted to engage a stop 132 upon a bracket head 133, the kicker finger being retracted by a spring 134 to the normal or inactive position shown in Fig. 14. The forward edge 135

of the kicker finger is of arcuate formation to afford a riding surface for the pin 128, so that, as the latter advances around the turn of the sprocket wheel, it will engage the kicker finger and force the same forward into the position indicated in Fig. 15, thereby imparting a final kick or impetus to the carton.

The kicker finger cooperates with a stop finger 136 of arcuate formation which is pivoted upon a pin 137 and normally occupies the position shown in Fig. 14. The tip end of the stop finger is positioned to be acted upon by a pin 138 carried by the chain slightly to the rear of the finger 127, and as the pin 138 engages the face of the stop finger 136, it will swing the same into the position shown in Fig. 15, which serves to stop the next succeeding carton in the intended position, as shown in Fig. 15. The arcuate formation of the stop finger 136 permits the pin 138 to travel around its orbit while momentarily maintaining the stop finger in the position shown. The stop finger 136 is acted upon by a spring 139 which normally holds it in the position shown in Fig. 14.

Gripper mechanism

A preliminarily distended carton having been fed forward by the first section of the chain feed will stand in the position best illustrated in Figs. 10, 11 and 12. In this position, the spread carton walls will stand with their lower edges lying within the elongated angle face plates 140 constituting the outer gripper jaws which cooperate with elongated inner jaw plates 141 which are straddled by the carton as it is advanced to the gripping position. The base sections of the angle face plates 140, in the position shown in Fig. 11, lie flush with the surface of the table 30 so as to afford no impediment to the sliding advance of the cartons to the gripping position. The gripper mechanisms are arranged in duplicate, so that a description of one of the grippers will suffice for both.

The face plates of the outer grippers are carried at each end by an arm 142, which constitutes the upper section of a bell crank lever 143 pivoted at 144 upon a lever arm 145 carrying the jaw plate 141. It is to be understood that the mechanism now being described is duplicated at each end of the inner and outer gripper plates. The free end of the bell crank lever 143 is pivoted to a telescoping rod 146 encircled by a coil spring 147, and the lower end of the telescoping rod is pivoted to the lever arm 145 at the point 148. The lever arm 145 is mounted at its lower end upon a rock shaft 149.

With the parts in the position shown in Fig. 11, the inner edge of the face plate 140 will contact with a stop flange 150 mounted upon a bridge plate 151 supported from the table, which stop flange limits the inward movement of the face plate 140 before the movement of the arm 145 is exhausted, so that the terminal movement of the arm will serve to open the jaw against the tension of the spring 147, as indicated in Fig. 11. It is understood that like gripping mechanism engages each of the carton walls, and that the rock shafts 149 are in duplicate, and that the gripper mechanisms carried thereby operate in unison.

Each of the rock shafts 149 carries a crank arm 152 which has a cam yoke 153 pivoted at its free end, each cam yoke having a roller 154 operating within a cam groove 155 in a cam 156, a separate cam being provided for each of the mechanisms. The cam yoke straddles the cam shaft 58, and the formation of the cams is such that the gripping mechanisms will move in unison from the innermost position shown in Fig. 11 to the outermost position shown in Fig. 12, during the cam cycle. In so doing, the inner jaw plates carried by the arms 145 will move forwardly until they grip the carton walls against the face plates of the outer jaw members, after which the gripped jaws will move in unison, drawing out the carton walls on opposite sides into the horizontal position shown in Fig. 12, which serves to drawn down the carton and cause the walls thereof to form bends along the lines 157, everything beyond said bend lines being drawn outwardly into a horizontal plane. This operation causes the cross partitions 34 of the cartons to swing outwardly from the folded overlapped position indicated in Fig. 11 into the transverse position shown in Fig. 12. The bases of the cross partitions are entered through slots 159 in the carton walls (Fig. 21) which coact with the vertical slots 160 in the partitions themselves, so that when the carton walls break along the bend lines 157 during the distending operation, the partitions being engaged within the slots 159 will of necessity be swung outwardly and in position to bring the bases of the cross partitions into projecting relation above the plane of the cross walls as thus distended, it being understood that the carton stands in inverted or upside-down position shown in Figs. 11 and 12.

The drawing outwardly of the carton walls by the grippers causes a lowering of the center portion of the carton from the position shown in Fig. 11 to the position shown in Fig. 12, and causes the inverted center fold 158 of the carton to be lowered until it ultimately contacts with a centrally disposed plunger plate 161 mounted upon a plunger rod 162, which during the lowering of the carton will itself be lowered until the carton contacts therewith as in Fig. 12.

The plunger rod 162 is slidably mounted through a boss 163 located in the center of the bridge plate 151, and the lower end of the plunger rod carries a cam yoke 164 having a roller 165 which rides upon the edge of a cam 166 mounted on the cam shaft 58. These parts are so related that after the grippers have moved to the outermost position shown in Fig. 12, the plunger plate 161 will be elevated, carrying with it the center portion of the carton, and simultaneously the grippers will begin to swing inwardly, which draws down the carton walls and begins to fold them around the edges of the cross partitions, causing the carton walls to bend along the previously formed score lines 167, so that the carton walls begin to assume the duplicate trough-shaped relation indicated in Fig. 21.

In order to prevent the body of the carton from being lifted upwardly by the inswinging of the gripper mechanisms, and to insure bending along the score lines 167, an overhanging plate 168 is provided mounted upon an arm 169 (Fig. 10) carried by a plunger rod 170. A steadying rod 171 is provided at the opposite end of the arm 169, which rod is slidably mounted within a block 172. The lower end of the plunger rod is connected through a screw adjustable link 173 with the rear end of an arm 174 having its opposite end carried by a pivot 175 provided in a depending bracket 176. The arm 174 carries a cam roller 177 riding upon a cam 178 mounted upon the cam shaft 58. These parts are so related to the cam for actuating the plunger plate 161 that the over-

hanging bar 168 will move in unison with the plunger plate and serve to steady the carton during the operation of folding the carton walls around the distended partitions. These operations will continue until the carton walls have assumed the position shown in Fig. 20, at which time the outer ends of the cross slots 159 will have moved into interlocking relation with notches 179 in the edges of the cross partitions, which concludes the distending operation performed by the machine. With the carton thus distended, collapse thereof will be prevented by the interlock afforded by the notches 179, which serve to maintain the bends afforded in the carton walls and maintain the troughlike relation thus provided.

Discharging mechanism

With the cartons fully distended, they will be fed to the left in Fig. 1, by the second section of the chain feed mechanism previously described, and will then stand in register with the discharge chute, best illustrated in Figs. 1, 2 and 20. The discharge chute consists of inner and outer guideways 180 and 181, each of which comprises an arcuate inner track member 182 and an arcuate outer track member 183, the track members being of concentrical curvature and affording between them a curving passageway of substantially 180° for supporting the ends of the erected cartons in processional relation during the period of discharge from the machine, and serving to reverse the cartons from the inverted relation and deliver them right side up from the machine.

During the discharging operation, the cartons, one above the other, will travel laterally in an upward and rearward curving line of advance, the procession of cartons being intermittently elevated by a lifting movement imparted to the last arriving carton at the tail end of the procession. The lifting operation is performed by an elevator plate 184 carried by a plunger rod 185 having at its lower end a cam yoke 186 which straddles the cam shaft 58 and is provided with a roller 187 riding upon the rim of a cam 188. As the last distended carton arrives in a position in register with the discharge chute, the lower edge of the carton will rest upon the table and straddle the elevator plate shown in Fig. 20. As the plate elevates, it will contact the aligned edges of the carton cross walls, and as the plate is elevated the carton will be lifted with the outer faces of the distended carton walls contacting the arcuate track members 182 and 183, which are provided with sloping steps 189, so that, as the carton is elevated, its lower edges will be lifted above the steps and will be retained thereon during the descent of the elevator. The steps are suitably spaced to permit the stack of distended cartons to be lifted step by step and intermittently feed along the discharging chute to the point of delivery, and discharged right side up, as before stated.

Marking mechanism

Means are provided for stamping the cartons with the day of the month or other suitable identifying insignia, which mechanisms are best illustrated in Figs. 17, 18 and 19. These mechanisms are mounted upon the left hand end of the elevator plate 184, as viewed in Fig. 17, and in the position to act upon the outermost cross wall of the distended carton immediately prior to its elevation through the discharge chute. The mechanisms comprise one or more embossed wheels 190, which as shown are arranged to emboss the number of the month and the day of the month. The wheels provided for embossing the day of the month are necessarily in duplicate to permit adjustment from 1 to 31, and adjacent each wheel is located an impression finger 191 pivoted at 192 and having its lower end connected with a link bar 193 which cooperates with a second link bar 194 medially pivoted to the first bar at one end and to a bracket 195 at its opposite end.

The lower end of the link bar 193 is pivoted to an adjustable stem 196 on the table 30, the arrangement being such that as the plunger rod 185 is elevated the linkage will swing the upper end of the impression finger 191 toward the embossed wheel or wheels and force the outermost cross wall of the carton into embossing relation therewith to secure the necessary imprint during the instant while the carton is being lifted through the first stage of the discharging operation.

Driving mechanism

As shown, the machine is operated from a motor 197 through a drive chain 198, which imparts the drive through gearing 199 and suitable clutch mechanism 200 to the cam shaft 58. Obviously, any other suitable driving connections might be provided.

Operation

In operation, a stack of collapsed flat folded cartons is placed within the open hopper in inverted position, with the folds along the score lines 167 presented upwardly and with the end cross partitions resting upon the horizontal side bars 32. The stacking of the cartons is facilitated by the lifting of the follower blades, and after a stack has been positioned and the follower blades lowered, the machine is ready to operate.

The follower blades act to force the stack forwardly and present the foremost carton in position to be acted upon by the plunger plates 47, which by their descent serve to force down the cartons singly and in position to have their free lower edges preliminarily distended by the mechanism described and to an extent sufficient to cause the carton to straddle the plunger plate 161 after the cartons have been moved by the chain feed to the medial position in the machine where the final distention occurs. In this position, the free edges of the carton walls will be tightly gripped by the grippers and drawn outwardly in the manner described, and the action of the grippers, supplemented by the movements of the plunger plate 161, serves to swing out the cross partitions into transverse relation and to wrap the carton walls around the partitions and interlock the same without the employment of any mechanism for directly engaging and swinging the cross partitions. In fact, this swinging movement of the cross partitions will occur while the medial portion of the carton is suspended above the plunger plate, so that the swinging action of the cross partitions is effected without frictional contact with any portion of the mechanism and as incidental to the distention of the carton walls. This simplifies the erecting operation and enables the same to be performed rapidly, accurately, and in a way which will not tend to crush or tear the cross partitions or the interlocks provided for their retention after erection.

Moreover, since the erecting operation is performed entirely by the distention of the carton walls, due to the conjoint action of the grippers and the plunger plate, extreme accuracy in the positioning of the cartons is not essential, since

the bite of the grippers extends throughout substantially the entire length of the carton walls, and the angled face plates of the movable gripper jaws provide a sufficiently accurate positioning of the lower edges of the carton walls to insure a proper feeding of the cartons to position and a proper gripping of the edges in preparation for the distending operation.

The collapsed cartons, after transverse delivery from the stack, will stand inverted and move in a straight longitudinal line and in processional relation from end to end of the machine while constantly maintaining the inverted position, which simplifies the feeding operation and enables the three sets of mechanisms involved in the preliminary distending, the erection, and the final delivery of the cartons, to be properly timed, so that the mechanisms of the groups will operate simultaneously on three successive cartons, with the result that the several operations will be speeded to the fullest degree and the intermittent travel of the procession of cartons will continue at a rapid rate and without interruption, and the final reversal of the cartons from the inverted position will not occur until the ultimate delivery, thereby maintaining the cartons in the most convenient position during the performance of the several feeding and erecting operations.

This method of delivery from the stack and the forward feeding of the cartons enables them to slide forward freely, each carton, after falling from the stack, dropping to the table and standing firmly by its own weight with its bottom edges distended and without the necessity for providing any means for tightly holding and conveying the carton to the erecting position, other than the means provided for sliding and directing it forward in the line of travel, first to the grippers where the distending and interlocking occurs, and thereafter to the position where it is delivered into the discharging chute. This is possible by reason of the inverted position assumed by the cartons and the preliminary distention of the carton walls, which makes it self-supporting at all times before and after the erecting operation.

Although the invention has been described with particularity as to detail, it is not the intention, unless otherwise indicated in the claims, to limit the invention to the mechanisms shown, since variations therefrom are permissible without departing from the spirit of the invention.

We claim:

1. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, means for retaining the collapsed cartons in stacked relation and standing in edgewise position, feeding means for feeding the cartons singly from the stack and delivering them in edgewise standing relation, means for preliminarily spreading the free edges of the body walls, and gripper elements adapted to engage said free edges of the body walls and distend the same laterally and incidentally cause the cross walls to swing transversely of the body walls of the carton.

2. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, means for retaining the collapsed cartons in stacked relation and standing in edgewise position, feeding means for feeding the cartons singly from the stack and delivering them in edgewise standing relation, means for preliminarily spreading the free edges of the body walls, gripper elements adapted to engage said free edges of the body walls and distend the same laterally and incidentally cause the cross walls to swing transversely of the body walls of the carton, and plunger mechanism positioned to lift the body of the carton concurrently with the movements of the gripper elements to effect a wrapping of the body walls of the carton around the edges of the cross walls.

3. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, means for retaining the collapsed cartons in stacked relation and standing in edgewise position, feeding means for feeding the cartons singly from the stack and delivering them in edgewise standing relation, means for preliminarily spreading the free edges of the body walls, gripper elements adapted to engage said free edges of the body walls and distend the same laterally and incidentally cause the cross walls to swing transversely of the body walls of the carton, plunger mechanism positioned to lift the body of the carton concurrently with the movements of the gripper elements to effect a wrapping of the body walls of the carton around the edges of the cross walls, and means for moving the erected cartons longitudinally after the erecting operation.

4. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, means for retaining the collapsed cartons in stacked relation and standing in edgewise position, feeding means for feeding the cartons singly from the stack and delivering them in edgewise standing relation, means for preliminarily spreading the free edges of the body walls, means for advancing the cartons longitudinally after the preliminary spreading, gripper elements adapted to engage said free edges of the body walls and distend the same laterally and incidentally cause the cross walls to swing transversely of the body walls of the carton, plunger mechanism positioned to lift the body of the carton concurrently with the movements of the gripper elements to afford a wrapping of the body walls of the carton around the edges of the cross walls and means for moving the erected cartons longitudinally after the erecting operation.

5. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, means for holding the collapsed cartons inverted in stacked relation and standing edgewise with the free edges of the body walls presented downwardly, plunger elements positioned to engage the foremost carton of the stack and feed the same downwardly therefrom, preliminary distending mechanisms including a swinging element adapted to engage the outermost body wall of the edgewise standing carton and separate the same from the inner-

most body wall, a pair of oppositely acting gripper elements each normally positioned to engage the free edge of the proximate carton wall, means for moving the gripper elements away from one another to further distend the carton walls and incidentally cause swinging of the cross walls to transverse position, and means located between the gripper elements for bodily moving the carton relatively to the gripper elements for causing the body walls to be wrapped around the extended cross walls.

6. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, means for holding the collapsed cartons inverted in stacked relation and standing edgewise with the free edges of the body walls presented downwardly, plunger elements positioned to engage the foremost carton of the stack and feed the same downwardly therefrom, preliminary distending mechanisms including a swinging element adapted to engage the outermost body wall of the edgewise standing carton and separate the same from the innermost body wall, feeding means for moving the preliminarily distended carton longitudinally away from the position occupied during the preliminary distention, a pair of oppositely acting gripper elements each normally positioned to engage the free edge of the proximate carton wall, means for moving the gripper elements away from one another to further distend the carton walls and incidentally cause swinging of the cross walls to transverse position, and means located between the gripper elements for bodily moving the carton relatively to the gripper elements for causing the body walls to be wrapped around the extended cross walls.

7. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, means for holding the collapsed cartons inverted in stacked relation and standing edgewise with the free edges of the body walls presented downwardly, plunger elements positioned to engage the foremost carton of the stack and feed the same downwardly therefrom, preliminary distending mechanisms including a swinging element adapted to engage the outermost body wall and separate the same from the innermost body wall, a pair of oppositely acting gripper elements each normally positioned to engage the free edge of the proximate carton wall, means for moving the gripper elements away from one another to further distend the carton walls and incidentally cause swinging of the cross walls to transverse position, means located between the gripper elements for bodily moving the carton relatively to the gripper elements for causing the body walls to be wrapped around the extended cross walls, and means for feeding the erected carton longitudinally from the position occupied during the last described erecting operations.

8. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, means for holding the collapsed cartons in stacked relation with the free edges of the body walls presented downwardly, plunger elements positioned to engage the foremost carton of the stack and feed the same downwardly therefrom, preliminary distending mechanisms including a swinging element adapted to engage the outermost body wall and separate the same from the innermost body wall, feeding means for moving the preliminarily distended carton longitudinally away from the position occupied during the preliminary distention, a pair of oppositely acting gripper elements each normally positioned to engage the free edge of the proximate carton wall, means for moving the gripper elements away from one another to further distend the carton walls and incidentally cause swinging of the cross walls to transverse position, means located between the gripper elements for bodily moving the carton relatively to the gripper elements for causing the body walls to be wrapped around the extended cross walls, and means for feeding the erected cartons longitudinally from the position occupied during the last described erecting operations.

9. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, means for holding the collapsed cartons in stacked relation with the free edges of the body walls presented downwardly, plunger elements positioned to engage the foremost carton of the stack and feed the same downwardly therefrom, preliminarily distending mechanisms including a swinging element adapted to engage the outermost body wall and separate the same from the innermost body wall, a pair of oppositely acting gripper elements each normally positioned to engage the free edge of the proximate carton wall, means for moving the gripper elements away from one another to further distend the carton walls and incidentally cause swinging of the cross walls to transverse position, means located between the gripper elements for bodily moving the carton relatively to the gripper elements for causing the body walls to be wrapped around the extended cross walls, means for feeding the erected cartons longitudinally from the position occupied during the last described erecting operations, a delivery chute adjacent the position to which the cartons are last fed, and plunger mechanism for lifting the erected cartons into and feeding them progressively through the delivery chute.

10. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, means for holding the collapsed cartons in stacked relation with the free edges of the body walls presented downwardly, plunger elements positioned to engage the foremost carton of the stack and feed the same downwardly therefrom, preliminary distending mechanisms including a swinging element adapted to engage the outermost body wall, feeding means for moving the preliminarily distended carton longitudinally away from the position occupied during the preliminary distention, a pair of oppositely acting gripper elements each normally positioned to engage the free edge of the proximate carton wall, means for moving the gripper elements away from one another to further distend the carton walls and incidentally cause swinging of the cross walls to transverse

position, means located between the gripper elements for bodily moving the carton relatively to the gripper elements for causing the body walls to be wrapped around the extended cross walls, means for feeding the erected cartons longitudinally from the position occupied during the last described erecting operations, a delivery chute adjacent the position to which the cartons are last fed, and plunger mechanism for lifting the erected cartons into and feeding them progressively through the delivery chute.

11. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, means for holding the collapsed cartons in stacked relation with the free edges of the body walls presented downwardly, plunger elements positioned to engage the foremost carton of the stack and feed the same downwardly therefrom, preliminary distending mechanisms including a swing element adapted to engage the outermost body wall and separate the same from the innermost body wall, a pair of oppositely acting gripper elements each normally positioned to engage the free edge of the proximate carton wall, means for moving the gripper elements away from one another to further distend the carton walls and incidentally cause swinging of the cross walls to transverse position, means located between the gripper elements for bodily moving the carton relatively to the gripper elements for causing the body walls to be wrapped around the extended cross walls, means for feeding the erected cartons longitudinally from the position occupied during the last described erecting operations, a delivery chute adjacent the position to which the cartons are last fed, plunger mechanisms for lifting the erected cartons into and feeding them progressively through, the delivery chute, opposed marker elements carried by the plunger mechanism and positioned to bear oppositely against a portion of the carton, and connections for actuating the marker elements by movements of the plunger mechanism.

12. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, means for holding the collapsed cartons in stacked relation with the free edges of the body walls presented downwardly, plunger elements positioned to engage the foremost carton of the stack and feed the same downwardly therefrom, preliminary distending mechanisms including a swinging element adapted to engage the outermost body wall and separate the same from the innermost body wall, feeding means for moving the preliminarily distended carton longitudinally away from the position occupied during the preliminiary distention, a pair of oppositely acting gripper elements each normally positioned to engage the free edge of the proximate carton wall, means for moving the gripper elements away from one another to further distend the carton walls and incidentally cause swinging of the cross walls to transverse position, means located between the gripper elements for bodily moving the carton relatively to the gripper elements for causing the body walls to be wrapped around the extended cross walls, means for feeding the erected cartons longitudinally from the position occupied during the last described erecting operation, a delivery chute adjacent the position to which the cartons are last fed, plunger mechanism for lifting the erected cartons into and feeding them progressively through the delivery chute, opposed marker elements carried by the plunger mechanism and positioned to bear oppositely against a portion of the carton, and connections for actuating the marker elements by movements of the plunger mechanism.

13. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, coacting groups of gripper elements including jaw members, each group of gripper members being pivotally mounted for oscillatory movements and each group including means to cause the jaw members to preliminarily engage one of the carton walls and said groups of gripper elements having oscillating movements of recession from one another thereafter to draw apart the carton walls and thereby cause swinging of the hinged cross walls into the intended transverse relation, and means for effecting relative movement between the groups of gripper elements and the body of the carton to effect a wrapping of the carton body walls around the transversely positioned cross walls.

14. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, coacting groups of gripper elements including jaw members, each group of gripper elements being pivotally mounted for oscillating movements and each group including means to cause the jaw members to preliminarily engage one of the carton walls and said groups of gripper elements having oscillatory movements of recession from one another thereafter to draw apart the carton walls and thereby cause swinging of the hinged cross walls into the intended transverse relation, and means for effecting relative movement between the groups of gripper elements and the body of the carton to effect a wrapping of the carton body walls around the transversely positioned cross walls, said means including plunger elements having movements coordinated with the movements of relative advance and recession of the groups of gripper elements.

15. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, coacting groups of gripper elements including jaw members, each group of gripper elements being pivotally mounted for oscillating movements and each group including means to cause the jaw members to preliminarily engage one of the carton walls and said groups of gripper elements having oscillatory movements of recession from one another thereafter to draw apart the carton walls and thereby cause swinging of the hinged cross walls into the intended transverse relation, means for effecting relative movement between the groups of gripper elements and the body of the carton to

effect a wrapping of the carton body walls around the transversely positioned cross walls, and means for feeding the cartons longitudinally away from the position occupied during the distending operation.

16. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, coacting groups of gripper elements including jaw members, each group of gripper elements being pivotally mounted for oscillating movements and each group adapted at the beginning of its oscillatory movement to cause the jaw members to preliminarily engage one of the carton walls and said groups of gripper elements having additional oscillatory movements of recession from one another thereafter to draw apart the carton walls and thereby cause swinging of the hinged cross walls into the intended transverse relation, means for effecting relative movement between the groups of gripper elements and the body of the carton to effect a wrapping of the carton body walls around the transversely positioned cross walls, said means including plunger elements having movements coordinated with the movements of relative advance and recession of the groups of gripper elements, and means for feeding the cartons longitudinally away from the position occupied during the distending operation.

17. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, coacting groups of gripper elements including jaw members, each group of gripper elements being pivotally mounted for oscillating movements and each group adapted at the beginning of its oscillatory movement to cause the jaw members to preliminarily engage one of the carton walls and said groups of gripper elements having additional oscillatory movements of recession from one another thereafter to draw apart the carton walls and thereby cause swinging of the hinged cross walls into the distended transverse relation, means for effecting relative movement between the groups of gripper elements and the body of the carton to effect a wrapping of the carton body walls around the transversely positioned cross walls, means for feeding the cartons longitudinally away from the position occupied during the distending operation, plunger mechanism located adjacent the position to which the cartons are fed by said feeding mechanism, and a delivery chute into which and through which the erected cartons are progressively moved by said plunger mechanism.

18. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, coacting groups of gripper elements including jaw members, each group of gripper elements being pivotally mounted for oscillating movements and each group adapted at the beginning of its oscillatory movement to cause the jaw members to preliminarily engage one of the carton walls and said groups of gripper elements having additional oscillatory movements of recession from one another thereafter to draw apart the carton walls and thereby cause swinging of the hinged cross walls into the intended transverse relation, means for effecting relative movement between the groups of gripper elements and the body of the carton to effect a wrapping of the carton body walls around the transversely positioned cross walls, said means including plunger elements having movements coordinated with the movements of relative advance and recession of the groups of gripper elements, means for feeding the cartons longitudinally away from the position occupied during the distending operation, plunger mechanism located adjacent the position to which the cartons are fed by said feeding mechanism, and a delivery chute into which and through which the erected cartons are progressively moved by said plunger mechanism.

19. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, the combination of a longitudinally extending table, means for maintaining a stack of cartons standing edgewise in inverted relation with respect to the table, plunger feeding elements for feeding the cartons singly from the stack with their free wall edges presented downwardly toward the table, means for preliminarily spreading the free wall edges, feeding means for advancing the preliminarily spread cartons to medial position along the table, oppositely disposed pivotally mounted grippers, each gripper comprising fixed and movable jaws and each gripper being mounted to swing toward and away from its companion gripper and positioned to bring the fixed and movable jaws of each gripper into position to engage the proximate free edge of a carton blank when moved to the medial position, and means for swinging the respective grippers away from one another and for causing the fixed and movable jaws to grip together to engage the intervening edge of the carton wall and draw the same outwardly to effect distention of the carton and a swinging of the hingedly mounted cross walls.

20. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, the combination of a longitudinally extending table, means for maintaining a stack of cartons standing edgewise in inverted relation with respect to the table, plunger feeding elements for feeding the cartons singly from the stack with their free wall edges presented downwardly toward the table, means for preliminarily spreading the free wall edges, feeding means for advancing the preliminarily spread cartons to a medial position along the table, oppositely disposed pivotally mounted grippers, each gripper comprising fixed and movable jaws and each gripper being mounted to swing toward and away from its companion gripper and positioned to bring the fixed and movable jaws of each gripper into position to engage the proximate free edge of a carton blank when moved to the medial position, means for swinging the respective grippers away from one another and for causing the fixed and movable jaws to grip together to engage the intervening edge of the carton wall and draw the same outwardly to effect distention of the carton and a swinging

of the hingedly mounted cross walls, and plunger means located between the grippers and having movements correlated therewith to move the body of the carton and conjointly with the gripper elements to effect a wrapping of the body walls of the carton around the extended cross walls.

21. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, the combination of a longitudinally extending table, means for maintaining a stack of cartons standing edgewise in inverted relation with respect to the table, plunger feeding elements for feeding the cartons singly from the stack with their free wall edges presented downwardly toward the table, means for preliminarily spreading the free wall edges, feeding means for advancing the preliminarily spread cartons to a medial position along the table, oppositely disposed pivotally mounted grippers, each gripper comprising fixed and movable jaws and each gripper being mounted to swing toward and away from its companion gripper and positioned to bring the fixed and movable jaws of each gripper into position to engage the proximate free edge of a carton blank when moved to the medial position, means for swinging the respective grippers away from one another and for causing the fixed and movable jaws to grip together to engage the intervening edge of the carton wall and draw the same outwardly to effect distention of the carton and a swinging of the hingedly mounted cross walls, plunger means located between the grippers and having movements correlated therewith to move the body of the carton and conjointly with the gripper elements to effect a wrapping of the body walls of the carton around the extended cross walls, feeding means for moving the cartons along the table from the erecting position, and means for discharging the erected cartons from the table.

22. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, the combination of a longitudinally extending table, means for maintaining a stack of cartons standing edgewise in inverted relation with respect to the table, plunger feeding elements for feeding the cartons singly from the stack with their free wall edges presented downwardly toward the table, means for preliminarily spreading the free wall edges, feeding means for advancing the preliminarily spread cartons to a medial position along the table, oppositely disposed pivotally mounted grippers, each gripper comprising fixed and movable jaws and each gripper being mounted to swing toward and away from its companion gripper and positioned to bring the fixed and movable jaws of each gripper into position to engage the proximate free edge of a carton blank when moved to the medial position, means for swinging the respective grippers away from one another and for causing the fixed and movable jaws to grip together to engage the intervening edge of the carton wall and draw the same outwardly to effect distention of the carton and a swinging of the hingedly mounted cross walls, plunger means located between the grippers and having movements correlated therewith to move the body of the carton and conjointly with the gripper elements to effect a wrapping of the body walls of the carton around the extended cross walls, feeding means for moving the cartons along the table from the erecting position, a delivery chute extending laterally from the table, and plunger means for elevating the erected cartons into and feeding them progressively through said delivery chute.

23. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, a pair of spaced grippers each comprising a swinging lever arm pivoted at its lower end and carrying a fixed jaw plate at its upper end, a movable jaw plate pivoted to each of the lever arms in position to coact with the fixed jaw plate, spring means for normally forcing the movable jaw plate toward the fixed jaw plate, a stop for each of the movable jaw plates, adapted to be engaged thereby before the inswinging movement of the lever arms are exhausted to open the jaws in position to engage the edges of a carton blank, and means for swinging the levers oppositely to permit the jaws to close upon the edges of the carton walls and carry the same outwardly to effect distention of the carton and a swinging of the cross walls.

24. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, a pair of spaced grippers each comprising a swinging lever arm pivoted at its lower end and carrying a fixed jaw plate at its upper end, a movable jaw plate pivoted to each of the lever arms in position to coact with the fixed jaw plate, spring means for normally forcing the movable jaw plate toward the fixed jaw plate, a stop for each of the movable jaw plates, adapted to be engaged thereby before the inswinging movements of the lever arms are exhausted to open the jaws in position to engage the edges of a carton blank, means for swinging the levers oppositely to permit the jaws to close upon the edges of the carton walls and carry the same outwardly to effect distention of the carton and a swinging outwardly of the cross walls, a plunger located between the swinging levers, and means for moving the plunger in coordinated relation to the lever movements to lift the carton body while the free edges are engaged by the grippers to effect wrapping of the body walls around the outwardly swinging cross walls.

25. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, means for holding the collapsed carton in inverted stacked relation with the free edges of the body walls presented downwardly, means for feeding the collapsed cartons singly from the stack and maintaining them in inverted relation, means adapted to engage the body walls and distend the same laterally and cause the cross walls to swing transversely of the body walls and to wrap the body walls of the carton around the edges of the cross walls with the carton standing in inverted relation, and discharging means and devices for feed-

ing the erected inverted cartons thereto, said discharging means being adapted to reverse the position of the cartons and deliver the same right side up from the machine.

26. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, means for holding the collapsed cartons in inverted stacked relation with the free edges of the body walls presented downwardly, means for feeding the collapsed cartons singly from the stack and maintaining them in inverted relation, means for preliminarily spreading the downwardly presented free edges of the body walls, means adapted to engage the body walls and distend the same laterally and cause the cross walls to swing transversely of the body walls and to wrap the body walls of the carton around the edges of the cross walls with the carton standing in inverted relation, and discharging means and devices for feeding the erected inverted cartons thereto, said discharging means being adapted to reverse the position of the cartons and deliver the same right side up from the machine.

27. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, means for holding the collapsed carton in inverted stacked relation with the free edges of the body walls presented downwardly, means for feeding the collapsed carton singly from the stack and maintaining it in inverted relation, means adapted to engage the body walls and distend the same laterally and cause the cross walls to swing transversely of the body walls and to wrap the body walls of the carton around the edges of the cross walls with the carton standing in inverted relation, and discharging means and devices for feeding the erected inverted cartons thereto, said discharging means being adapted to reverse the position of the cartons and deliver the same right side up from the machine, said discharging means including an arcuate chute through which the cartons are progressively fed and turned from inverted position to right side up position prior to the ultimate discharge therefrom.

28. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, means for holding the collapsed cartons in inverted stacked relation with the free edges of the body walls presented downwardly, means for feeding the collapsed cartons singly from the stack and maintaining them in inverted relation, means for preliminarily spreading the downwardly presented free edges of the body walls, means adapted to engage the body walls and distend the same laterally and cause the cross walls to swing transversely of the body walls and to wrap the body walls of the carton around the edges of the cross walls with the carton standing in inverted relation, and discharging means and devices for feeding the erected inverted cartons thereto, said discharging means being adapted to reverse the position of the cartons and deliver the same right side up from the machine, said discharging means including an arcuate chute through which the cartons are progressively fed and turned from inverted position to right side up position prior to the ultimate discharge therefrom.

29. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, means for holding the collapsed carton in inverted stacked relation with the free edges of the body walls presented downwardly, means for feeding the collapsed carton singly from the stack and maintaining it in inverted relation, means adapted to engage the body walls and distend the same laterally and cause the cross walls to swing transversely of the body walls and to wrap the body walls of the carton around the edges of the cross walls with the carton standing in inverted relation, and discharging means and devices for feeding the erected inverted cartons thereto, said discharging means being adapted to reverse the position of the cartons and deliver the same right side up from the machine, said discharging means including an arcuate chute through which the cartons are progressively fed and turned from inverted position to right side up position prior to the ultimate discharge therefrom, and plunger mechanism for forcing the cartons step by step in processional order through the chute.

30. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, means for holding the collapsed cartons in inverted stacked relation with the free edges of the body walls presented downwardly, means for feeding the collapsed cartons singly from the stack and maintaining them in inverted relation, means for preliminarily spreading the downwardly presented free edges of the body walls, means adapted to engage the body walls and distend the same laterally and cause the cross walls to swing transversely of the body walls and to wrap the body walls of the carton around the edges of the cross walls with the carton standing in inverted relation, and discharging means and devices for feeding the erected inverted cartons thereto, said discharging means being adapted to reverse the position of the cartons and deliver the same right side up from the machine, said discharging means including an arcuate chute through which the cartons are progressively fed and turned from inverted position to right side up position prior to the ultimate discharge therefrom, and plunger mechanism for forcing the cartons step by step in processional order through the chute.

31. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, means for holding the collapsed cartons in inverted stacked relation with the free edges of the body walls presented downwardly, means for feeding the collapsed cartons singly from the stack and maintaining them in inverted relation, means for preliminarily spreading the downwardly presented free edges of the body walls to permit the cartons to stand freely by their own weight, means for

sliding forward the freely standing cartons in endwise procession beyond the position to which they are delivered from the stack to the position for final erection, and erecting means there located and adapted to engage the body walls and distend the same laterally and cause the cross walls to swing transversely of the body walls and to wrap the body walls of the carton around the edges of the cross walls with the carton standing in inverted relation.

32. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, means for holding the collapsed cartons in inverted stacked relation with the free edges of the body walls presented downwardly, means for feeding the collapsed cartons singly from the stack and maintaining them in inverted relation, means for preliminarily spreading the downwardly presented free edges of the body walls to permit the cartons to stand freely by their own weight, means for sliding forward the freely standing cartons in endwise procession beyond the position to which they are delivered from the stack to the position for final erection, erecting means adapted to engage the body walls and distend the same laterally and cause the cross walls to swing transversely of the body walls and to wrap the body walls of the carton around the edges of the cross walls with the carton standing in inverted relation, and discharging means and devices for feeding the erected inverted cartons thereto, said discharging means being adapted to reverse the position of the cartons and deliver the same right side up from the machine.

33. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, means for holding the collapsed cartons in inverted stacked relation with the free edges of the body walls presented downwardly, means for feeding the collasped cartons singly from the stack and maintaining them in inverted relation, means for preliminarily spreading the downwardly presented free edges of the body walls to permit the cartons to stand freely by their own weight, means for sliding forward the freely standing cartons in endwise procesion beyond the position to which they are delivered from the stack to the position for final erection, erecting means there located and adapted to engage the body walls and distend the same laterally and cause the cross walls to swing transversely of the body walls and to wrap the body walls of the carton around the edges of the cross walls with the carton standing in inverted relation, discharging means located beyond the position occupied by the erecting means, and means for sliding forward the freely standing erected cartons in endwise procession to the position occupied by the discharging means.

34. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, means for retaining the collapsed cartons in stacked relation and standing in edgewise position, feeding means for feeding the cartons singly from the stack and delivering them in edgewise standing relation, fanning devices adapted to brush against the edges of the stacked cartons to assist the advance thereof to the feeding point, and gripper elements adapted to engage said free edges of the body walls and distend the same laterally and incidentally cause the cross walls to swing transversely of the body walls of the carton.

35. In a carton erecting machine designed to erect collapsed cartons having body walls medially folded longitudinally to bring their free edges into flat lying relation and having cross walls hingedly connected with the body walls and lying flatwise between the body walls, means for retaining the collapsed cartons in stacked relation and standing in edgewise position, feeding means for feeding the cartons singly from the stack and delivering them in edgewise standing relation, fanning devices adapted to brush against the edges of the stacked cartons to assist the advance thereof to the feeding point, means for preliminarily spreading the free edges of the body walls, and gripper elements adapted to engage said free edges of the body walls and distend the same laterally and incidentally cause the cross walls to swing transversely of the body walls of the carton.

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