

Aug. 29, 1939.

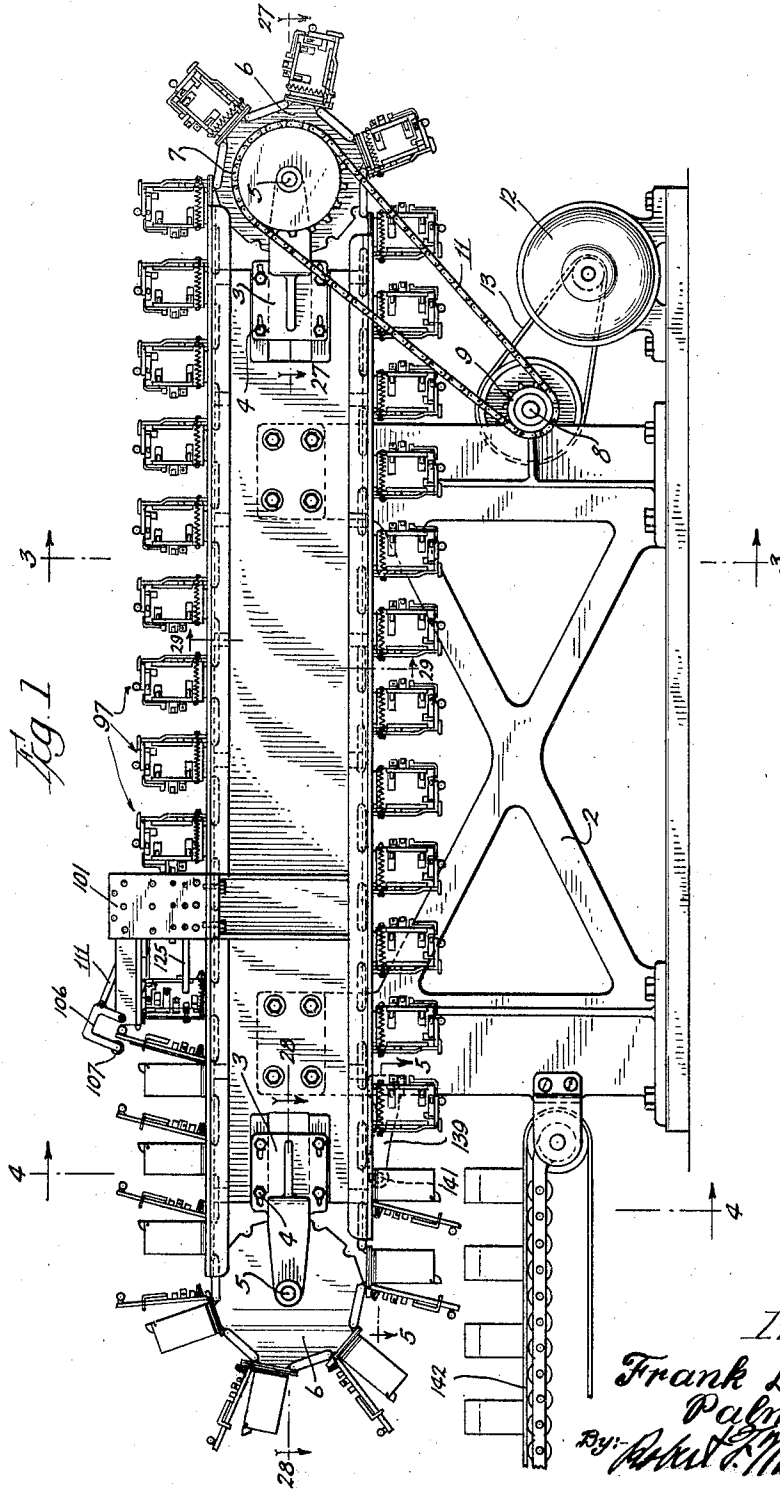
F. D. PALMER

2,171,418

CARTON MACHINE AND METHOD OF FORMING CARTONS

Filed July 20, 1936

8 Sheets-Sheet 1



Aug. 29, 1939.

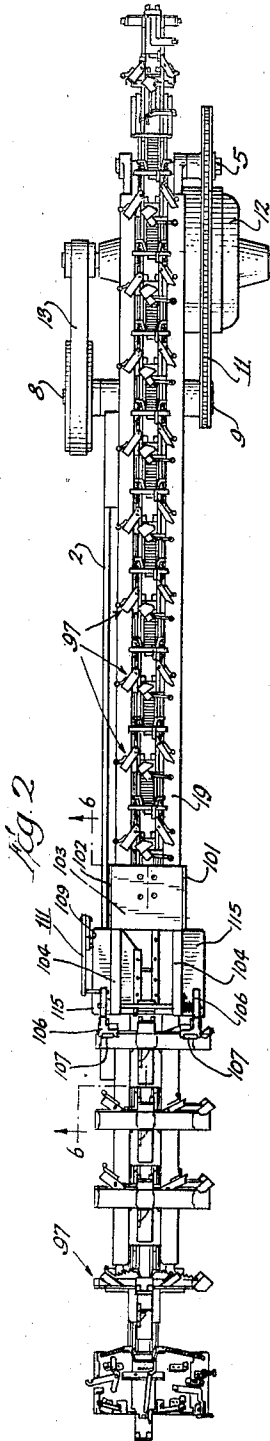
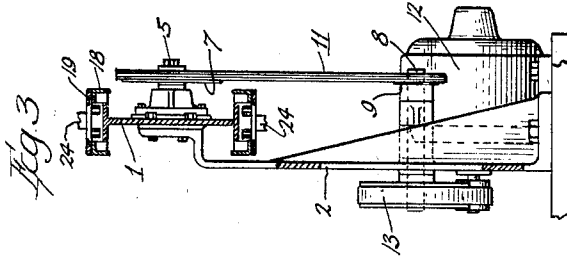
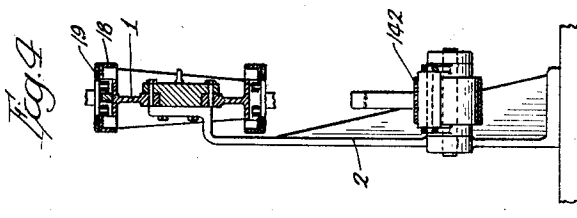
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CARTON MACHINE AND METHOD OF FORMING CARTONS

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8 Sheets-Sheet 2



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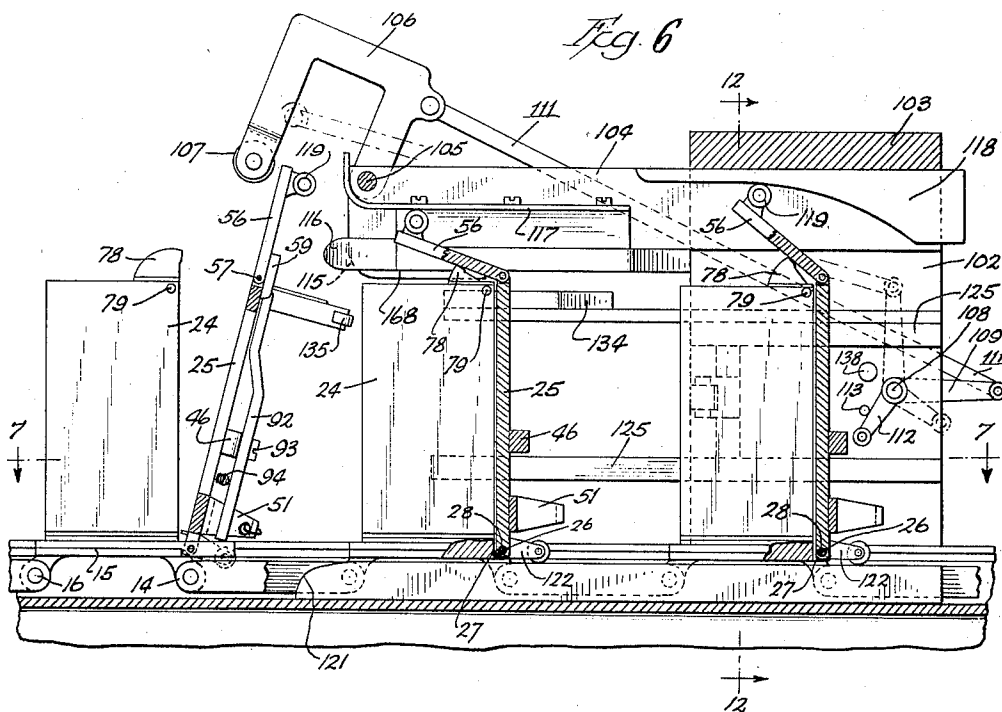
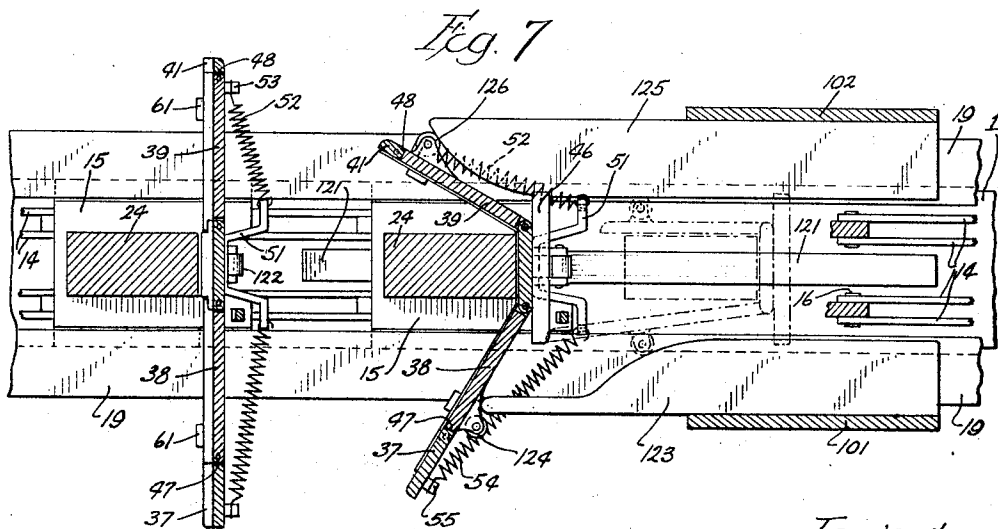
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CARTON MACHINE AND METHOD OF FORMING CARTONS

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8 Sheets-Sheet 3



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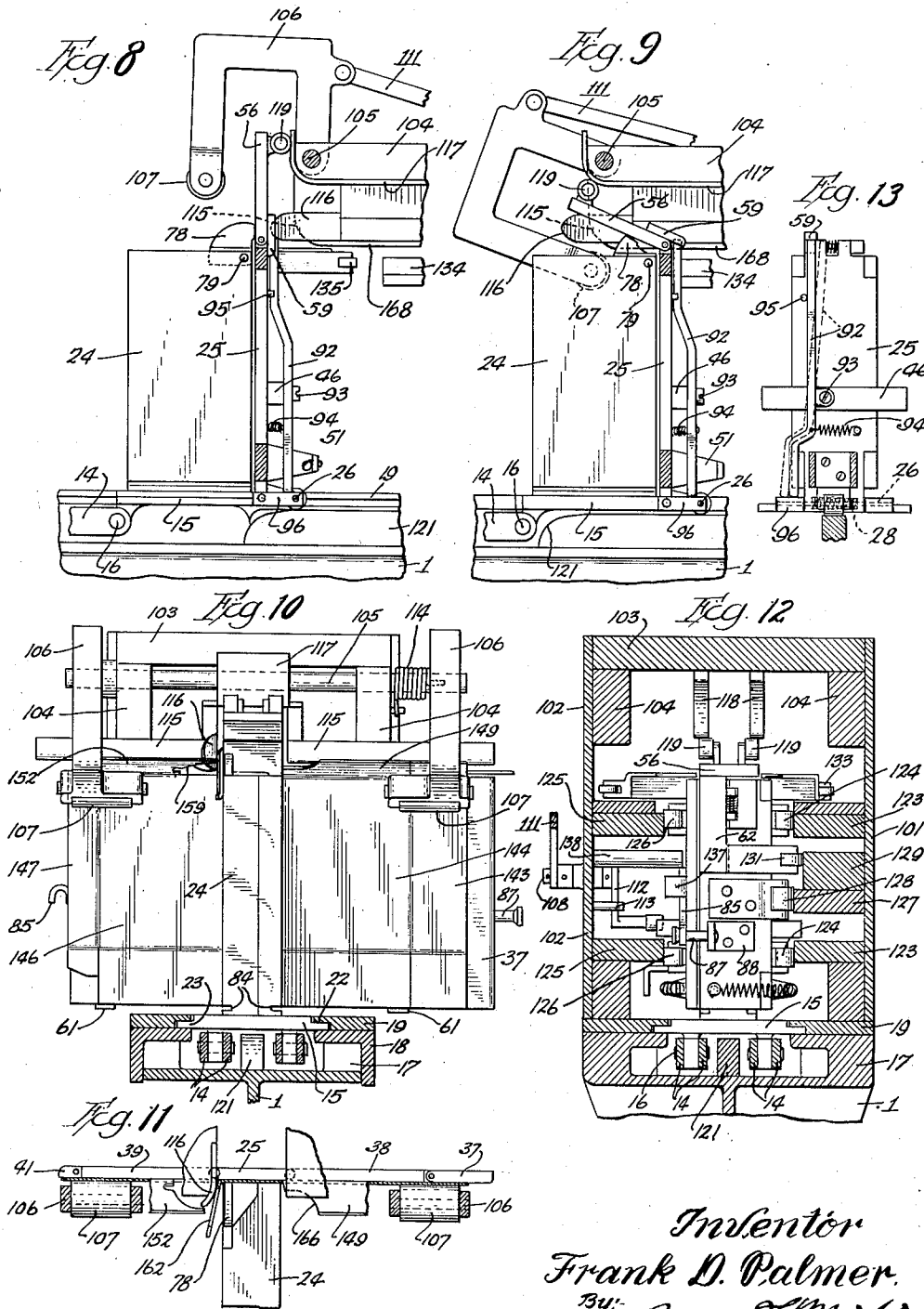
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CARTON MACHINE AND METHOD OF FORMING CARTONS

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8 Sheets-Sheet 4



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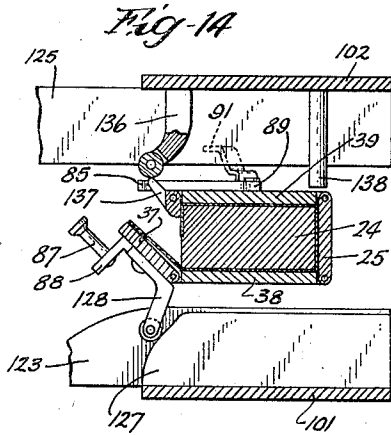
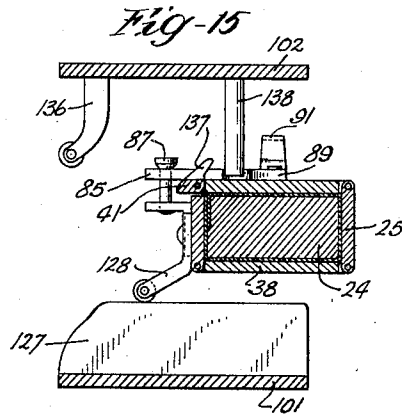
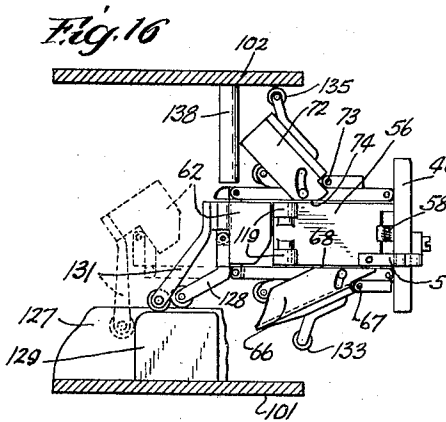
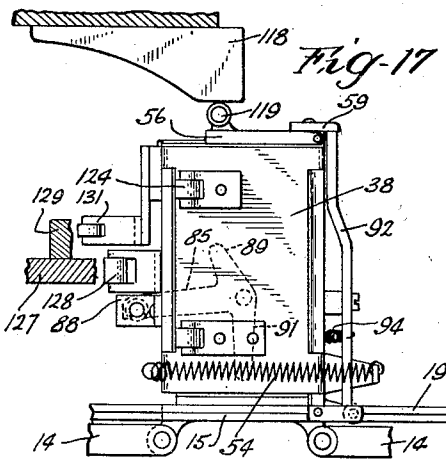
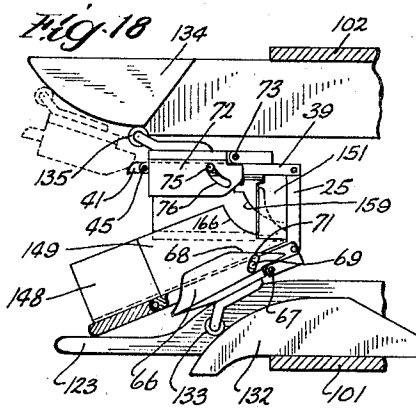
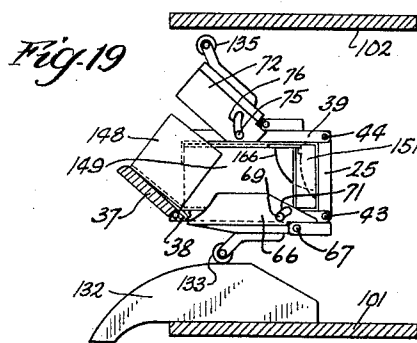
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CARTON MACHINE AND METHOD OF FORMING CARTONS

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8 Sheets-Sheet 5



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2,171,418

CARTON MACHINE AND METHOD OF FORMING CARTONS

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8 Sheets-Sheet 6

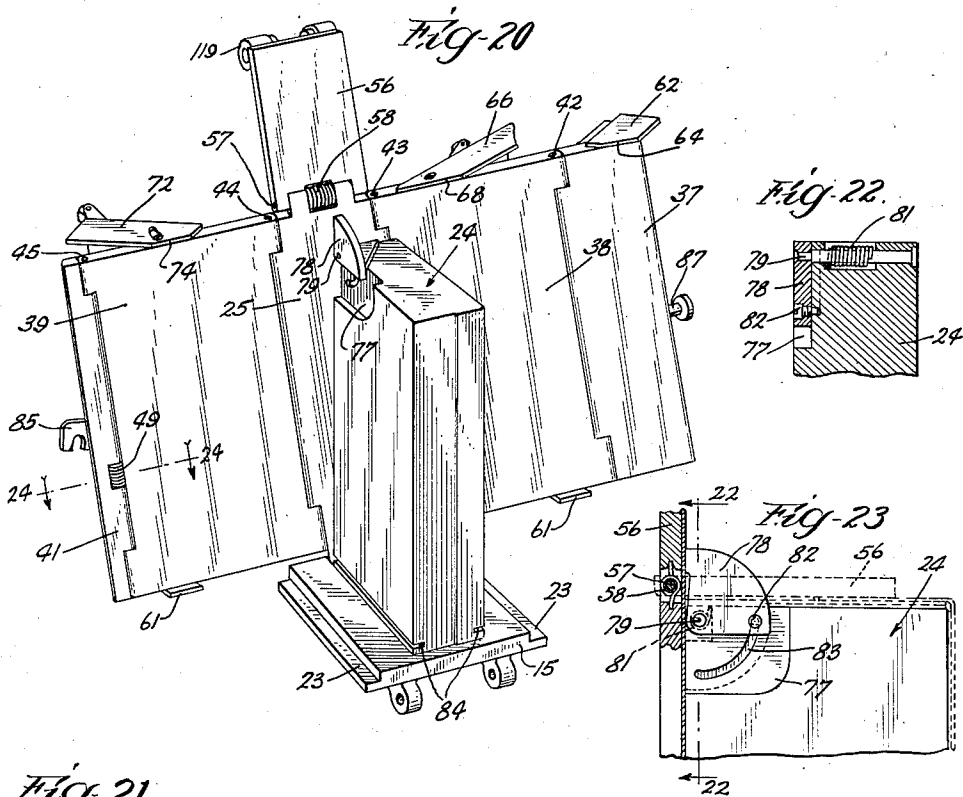
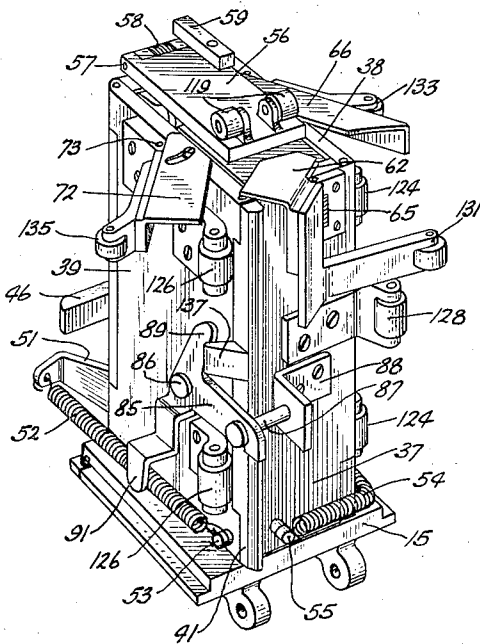
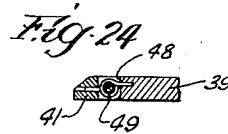
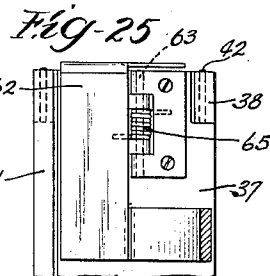


Fig. 21



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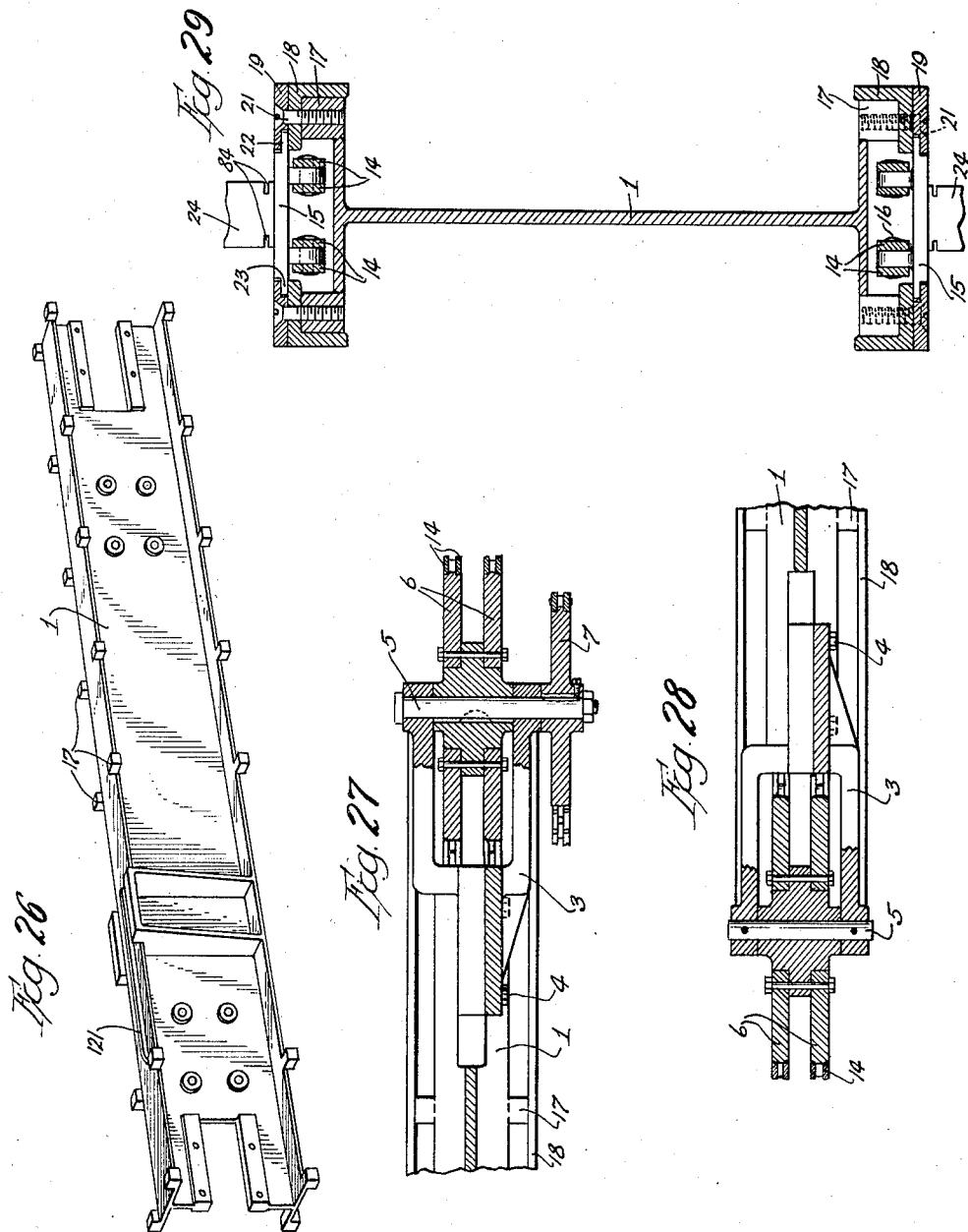
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CARTON MACHINE AND METHOD OF FORMING CARTONS

Filed July 20, 1936

8 Sheets-Sheet 7



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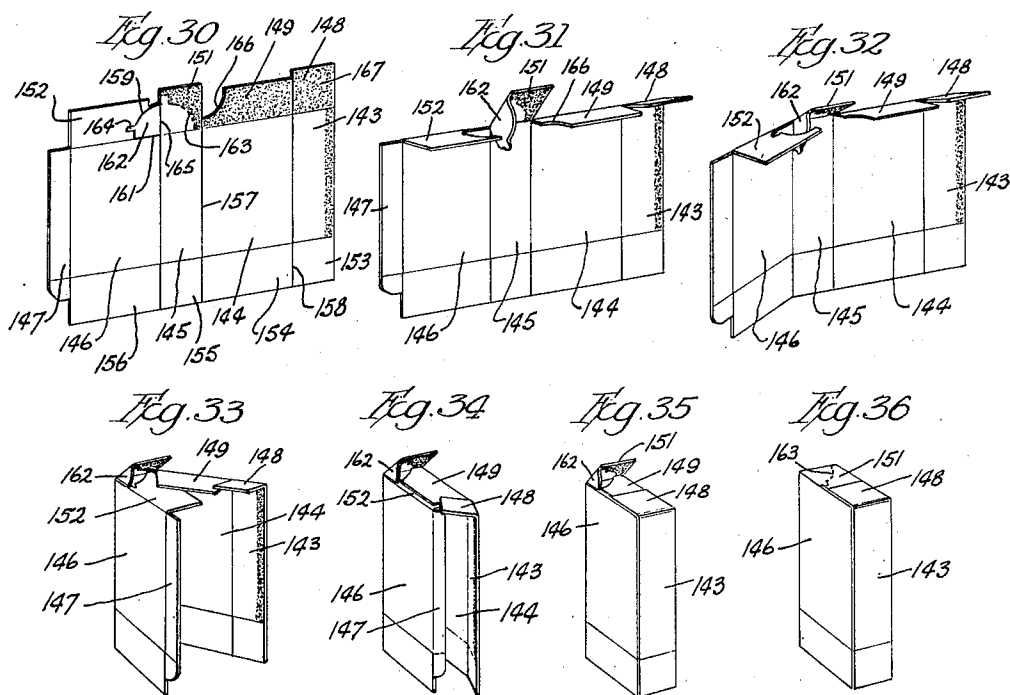
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CARTON MACHINE AND METHOD OF FORMING CARTONS

Filed July 20, 1936

8 Sheets-Sheet 8



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UNITED STATES PATENT OFFICE

2,171,418

CARTON MACHINE AND METHOD OF FORMING CARTONS

Frank D. Palmer, Chicago, Ill., assignor, by direct and mesne assignments, of one-third to Oliver P. Kline and one-third to Cranston Spray, both of Chicago, Ill.

Application July 20, 1936, Serial No. 91,519

59 Claims. (Cl. 93—44)

My invention relates particularly to a machine and method of forming cardboard cartons although not limited to this use alone.

The general object of the invention resides in the provision of a novel and practical carton machine and method of forming cartons, particularly with a view toward the economical and desirable manufacture of cartons, the invention contemplating the formation from a carton blank of the circumscribing sides and one end of a carton in at least partially concomitant relation with obvious practical advantage.

A further object of the invention resides in the provision of a novel and practical carton machine and method of forming cartons provided with desirable and practical dispenser formation, particularly with a view toward the economical and practical manufacture of dispenser equipped cartons as above set forth.

With this object in view my invention consists in certain features of novelty in the construction, combination and arrangement of parts by which the said objects and certain other objects, hereinafter appearing, are effected, all as fully described with reference to the accompanying drawings and more particularly pointed out in the appended claims.

In the said drawings—

Figure 1 is a partial side elevation of a carton machine embodying my invention;

Figure 2 is a partial top plan view of the same;

Figure 3 is a sectional view substantially on the line 3—3 of Figure 1;

Figure 4 is a sectional view substantially on the line 4—4 of Figure 1;

Figure 5 is a partial sectional view substantially on the line 5—5 of Figure 1;

Figure 6 is a partial sectional view substantially on the line 6—6 of Figure 2;

Figure 7 is a sectional view substantially on the line 7—7 of Figure 6;

Figure 8 is a partial sectional view similar to Figure 6 and showing parts in different positions than those in which they are shown in Figure 6;

Figure 9 is a partial sectional view similar to Figure 8 and showing parts in different positions than those in which they are shown in Figure 8;

Figure 10 is a partial sectional view looking to the right on Figure 9;

Figure 11 is a partial top plan view of the mechanism shown in Figures 8 and 9 and showing the parts in transition between the positions of Figures 8 and 9;

Figure 12 is a partial sectional view substantially on the line 12—12 of Figure 6 and showing

ing parts somewhat advanced from the positions in which they are shown in Figure 6;

Figure 13 is a partial front elevation of one of the forming units hereinafter described and with parts shown in section;

Figures 14 and 15 are similar partial sectional views in plan showing a forming unit, hereinafter described, and certain parts thereof in different positions;

Figure 16 is a partial sectional view in plan showing a forming unit somewhat advanced from the position in which it is shown in Figure 15;

Figure 17 is a partial sectional view in side elevation showing a forming unit in substantially the same position as it is shown in Figure 16;

Figure 18 is a partial sectional view in plan showing a forming unit in a position previous to that in which it is shown in Figure 14;

Figure 19 is a partial sectional view in plan showing a forming unit in approximately the same position as that in which it is shown in Figure 14;

Figure 20 is a perspective view of a forming unit in open or carton blank receiving position;

Figure 21 is a similar perspective view of a forming unit locked in closed or carton forming position;

Figure 22 is a partial section substantially on the line 22—22 of Figure 23 and showing a part in a different position from that in which it is shown in Figure 23;

Figure 23 is a partial side elevation of a forming unit with parts broken away and shown in section and showing parts in the positions in which they are shown in Figure 8;

Figure 24 is a partial section on the line 24—24 of Figure 20;

Figure 25 is a partial rear elevation of a forming unit and showing parts in the positions in which they are shown in Figure 16 and having a part broken away and shown in section;

Figure 26 is a perspective of the main or track frame of the machine;

Figure 27 is a partial sectional view on the line 27—27 of Figure 1;

Figure 28 is a partial sectional view on the line 28—28 of Figure 1;

Figure 29 is a partial sectional view on the line 29—29 of Figure 1; and

Figures 30 to 36 are perspective views illustrating progressively the manner in which a carton is formed in accordance with my invention, Figure 30 illustrating a carton blank and Figure 36 illustrating a carton completed in so

far as the circumscribing sides and one end thereof are concerned.

Referring to the drawings, 1 designates a frame of I-beam section which, as shown, is disposed horizontally with the web thereof in a vertical plane. See Figures 1 and 26. This frame is supported in the aforesaid position by a base 2. Bearing brackets 3 are adjustably secured, as generally designated at 4 in Figure 1, at opposite ends of the frame 1.

Shafts 5 are mounted on the brackets 3 on horizontal axes normal to the web of the frame 1, and one of which is secured with its bracket, see Figure 28, and the other of which is journaled on its bracket for rotation, see Figure 27. Double sprockets 6 are mounted on the shafts 5, one of which is mounted for rotation on the stationary shaft 5 and the other of which is secured on the rotatable shaft 5 for rotation therewith.

A chain sprocket 7 is secured on the rotatable shaft 5, see Figure 27, and a countershaft 8 is journaled on the base 2 and has a chain sprocket 9 secured thereon. A transmission chain 11 is trained over the sprockets 7 and 9 to drive the sprocket 7 and the rotatable shaft 5 from the shaft 8, and an electric motor 12 serves to drive the shaft 8 by means of a belt drive, generally designated at 13, thus driving the sprocket 7 and the rotatable shaft 5.

A forming unit chain is trained over the double sprockets 6 and comprises alternate double links 14 and straddle links 15, of which the links 15 form the bases of the carton forming units, hereinafter described, the links 14 and 15 being pivotally connected, as designated at 16.

The flanges of the frame 1 are provided with longitudinally spaced bosses 17 at the edges thereof, and longitudinally extending angles 18 and strips 19 are secured on said bosses by means of screws 21, the strips 19 being provided with opposing offsets 22 forming opposing guideways, in cooperation with the angles 18, extending between the sprockets 5.

The links 15 are provided with reduced side edge portions 23 which are slidably engaged in the aforesaid opposing guideways to positively guide the links 15 in their movement between the sprockets 6. See Figures 10, 12, 20, 21 and 29.

As aforesaid, the alternate links 15 form the bases of the carton forming units, and each of these forming units consists as follows:

An inner form member 24 of multi-sided rectangular formation is secured centrally on a link 15 and projects outwardly therefrom with reference to the path of the chain comprising the links 14 and 15. This inner form member is approximately the shape of the interior of a carton to be formed thereon and is so positioned on the link 15 that opposite sides of the form member are substantially parallel to the movement thereof with the chain comprising the links 14 and 15. See Figures 1, 6, 7 and 20.

An outer side-forming member 25 is pivotally mounted at its inner end, as designated at 26, on the leading end of the link 15 for facewise movement toward and away from the corresponding face of the inner form member 24, movement of the member 25 away from the member 24 being limited by the lower end 27 of the member 25 striking an opposing surface of the link 15. See Figure 6. A torsional coil spring 28 is associated with the pivotal mounting 26 of the forming member 25 and serves to yieldably urge

the member 25 away from the inner form member 24.

Additional outer side forming members 37, 38 and 39, a side glue flap forming member 41 and the side forming member 25 are sequentially arranged, and are pivotally mounted one upon another by means of parallel pivot mountings 42, 43, 44 and 45 disposed transverse to the pivot mounting 26, so that these side forming members and the side glue flap form member are relatively movable facewise in a common plane to and from a position in which the forming planes thereof are disposed at one side of a carton blank receiving plane, as shown in Figure 20, and another position in which said forming planes are in forming position, as shown in Figure 21. The arrangement is such that the side forming member 25 is disposed between the forming members 38 and 39, and that the side forming member 37 and the glue flap member 41 are the terminal members of the assembly for cooperation as hereinafter described.

Pivotal movement of the side forming members 38 and 39 into a common plane with reference to the side forming member 25 is limited by a transverse stop bar 46. See Figures 6 and 21. Pivotal movement of the side forming member 37 into a common plane with reference to the side forming member 38 is limited by a corner 47 of the member 37 engaging an opposing portion of the member 38. See Figure 7. Pivotal movement of the glue flap member 41 into a common plane with reference to the side forming member 39 limited by a corner 48 of the member 41 engaging an opposing portion of the member 39. See Figure 7.

A torsional spring 49 is associated with the pivot mounting 45 and serves to yieldably urge the glue flap member 41 into a common plane with reference to the side forming member 39. See Figures 20 and 24. A bracket 51 is secured transversely on the member 25 and extends outwardly from both sides thereof. See Figures 7 and 21. A tension spring 52 has one end secured on the corresponding end of the bracket 51 and has its other end secured on a stud 53 secured on the side forming member 39, to the end that this side forming is yieldably urged into a common plane with reference to the side forming member 25.

A tension spring 54 has one end secured on the corresponding end of the bracket 51 and has its other end secured on a stud 55 secured on the side forming member 37, to the end that the side forming members 37 and 38 are yieldably urged into a common plane with reference to the side forming member 25, see Figures 7, 12 and 21, the spring 53 bending about the corner formed by the side forming members 37 and 38 when they are angularly disposed as shown in Figures 12 and 21.

An outer top forming member 56 is pivotally mounted, as designated at 57, on the outer end of the side forming member 25 on an axis parallel to that of the pivotal mounting 26 of the member 25 and accordingly normal to the parallel axes of the pivot mountings 42, 43, 44 and 45 of the outer side forming members and the side glue flap member. See Figures 6, 7 and 20.

The top forming member 56 is thus pivotally movable relative to the member 25 facewise in a plane normal to the plane of relative facewise movement of the outer side forming and glue flap members to and from a position in which the forming plane thereof is disposed at one side of the aforesaid carton blank receiving plane, 75

as shown in Figure 20, and another position in which the forming plane thereof is in forming position, as shown in Figure 21.

A torsion spring 58 is associated with the pivot mounting 57 and serves to yieldably urge the top forming member 56 into a common plane with reference to the side forming member 25. A lock bar 59 secured on the top forming member 56 and projecting therefrom is engageable against the side forming member 25, as shown in Figure 8, to limit movement of the member 56 into a common plane with reference to the member 25.

The carton blank receiving position of the forming unit is that in which the forming faces of the outer forming members 25, 37, 38, 39, 41 and 56 are in a common plane or at one side of a carton blank receiving plane and preferably in which the forming member 25, and with it the remainder of the aforesaid outer forming members, are tilted away from the inner form member 24 to facilitate insertion of a carton blank. See Figures 6 and 20. Carton blank rests 61 are mounted on the inner ends of the outer side forming members 38 and 39, the carton blank, hereinafter described, being registered laterally of the forming unit by suitable means not shown.

An outer top forming member 62 is pivotally mounted, as designated at 63, on the forming member 37 on an axis parallel to that of the pivot mounting 42, and the forming portion of the member 62 is disposed normal to the axis of the mounting 63 and to pass over the outer end of the member 37. As thus mounted, the forming member 62 is pivotally movable from a forming position projecting beyond the forming plane of the member 37, as shown in Figure 18, to a non-forming position in which it clears this forming plane, as shown in Figures 16 and 20, the member 62 being cut away diagonally, as shown at 64, for such clearance.

A usual stop means, not shown, limits movement of the forming member 62 into its non-forming position, and a torsion spring 65 associated with the pivotal mounting 63, see Figures 21 and 25, yieldably urges the forming member 62 into its non-forming position.

An outer top forming member 66 is pivotally mounted, as designated at 67, on the forming member 38 on an axis parallel to that of the pivot mounting 43, and the forming portion of the member 66 is disposed normal to the axis of the mounting 67 and to pass over the outer end of the member 38. See Figures 16, 18 and 20. As thus mounted the forming member 66 is pivotally movable from a forming position projecting beyond the forming plane of the member 38, as shown in Figure 18, to a non-forming position in which it clears this forming plane, as shown in Figure 16 and 20, the member 66 being cut away diagonally, as shown at 68, for such clearance.

A stop pin 69, mounted on the outer end of the member 38, slidably engages in a segment slot 71 through the member 66 to limit movement of the member 66 into its non-forming position, and a torsion spring, not shown but similar to the spring 65, is associated with the mounting 67 to yieldably urge the member 66 into its non-forming position.

An outer top forming member 72 is pivotally mounted, as designated at 73, on the forming member 39 on an axis parallel to that of the pivot mounting 44, and the forming portion of the member 72 is disposed normal to the axis of the mounting 73 and to pass over the outer end of

the member 39. As thus mounted the forming member 72 is pivotally movable from a forming position projecting beyond the forming plane of the member 39, as shown in Figure 18, to a non-forming position in which it clears this forming plane, as shown in Figures 16 and 20, the member 72 being cut away diagonally, as shown at 74, for such clearance.

A stop pin 75, mounted on the outer end of the member 39, slidably engages in a segment slot 76 through the member 72 to limit movement of the member 72 into its non-forming position, and a torsion spring, not shown but similar to the spring 65, is associated with the mounting 73 to yieldably urge the member 72 into its non-forming position.

The inner form member 24 is provided with a recess 77 in one of the sides thereof normal to the forming plane of the outer side forming member 25 and of the top forming member 56, said recess occurring at one of the outer tri-corners of the inner form member adjacent the forming member 25. See Figures 20, 22 and 23. This recess is open at all three of the surfaces of the inner form member 24 forming said tri-corner including the outer end side of the inner form member, as best shown in Figure 20.

An auxiliary inner form member 78, which as shown is of quadrant shape, is disposed in a plane corresponding with that of the recess 77 and of said recessed side of the inner form member normal to the forming plane of the member 25, and is pivotally mounted in the region of its apex on the inner form member 24, as designated at 79, on an axis disposed normal to the plane of this auxiliary inner form member and the side of the inner form member having the recess 77 and disposed in the region of the aforesaid tri-corner. See Figures 20, 22 and 23.

As so mounted, the auxiliary form member 78 is pivotally mounted on the inner form member 24 to and from a position projecting from the outer side of the inner form member, as shown in Figures 8, 20 and 23, and a retracted position substantially within the recess 77, as shown in Figure 22.

The pivot mounting 79 is disposed parallel to the pivot mounting 57 of the forming member 56, and a radial side of the auxiliary form member 78 opposes the forming member 56, so that the auxiliary form member is moved into its retracted position by movement of the forming member 56 into forming position as hereinafter described. A torsion spring 81 is associated with the pivot mounting 79 and yieldably urges the auxiliary form member 78 into its projecting position, a screw stud 82 on the auxiliary form member slidably engaging in a segmental slot 83 in the inner form member 24 to limit the auxiliary form member in its projecting position.

The carton blank receiving position of the forming unit, as hereinbefore described, is shown in Figure 20, and the final forming position of the forming unit is shown in Figure 21 in which the outer side forming members 25, 37, 38 and 39 and the outer top forming member 56 are disposed in opposing relation with the corresponding sides of the inner form member 24, the auxiliary inner form member 78 having been moved to its retracted position by the outer top forming member 56. In the carton forming position of the forming unit, the carton blank rests 61 are received within grooves 84 in the inner form member 24.

Preferably, the forming unit is locked in its

forming position for the setting of glue previously applied to the carton blank, as hereinafter described, and for this purpose the following is provided.

A lock lever 85 of hook form is pivotally mounted, as designated at 86, on the forming member 39, and a headed lock stud 87 is secured on the forming member 37 by means of a bracket 88. See Figures 15, 17 and 21. When the outer side forming members are in forming position the lock lever 85 may be engaged on the stud 87 under the head thereof to releasably lock the outer side forming members in forming position, the pivot mounting 86 affording locking and releasing movement of the lock lever. The locking lever 85 is provided with oppositely extending arms 89 and 91 for the purpose of actuating the lock lever as hereinafter described.

A locking lever 92 is intermediately pivoted, as designated at 93, on the outer side forming member 25. See Figures 9 and 13. When the top forming member 56 is in forming position the outer end of the locking lever 92 may engage under the lock bar 59 to lock the forming member 56 in forming position, as shown in Figure 13. A spring 94 yieldably urges the locking lever 92 into locking position and a stop pin 95 on the forming member 25 limits locking movement of the locking lever, thus affording automatic locking of the outer top forming member in forming position.

The inner end of the locking lever 92 is offset laterally and is adapted to engage on a projection 96 on the link 15, so that, as the outer side forming member 25 pivots away from the inner form member 24 on the pivot mounting 26, the locking lever 92 is moved into unlocking position, as shown in dotted lines in Figure 13, thus providing for automatic unlocking of the forming member 56 as the outer side forming member 25 moves into carton blank receiving position.

The outer side forming members 25, 37, 38 and 39 and the outer top forming member 56 being yieldably urged into carton blank receiving position, it follows that movement of the lock lever 85 into released position serves to automatically unlock the outer top forming member 56 for movement into carton blank receiving position.

As hereinafter indicated, each link 15 of the chain, comprising the links 14 and 15, carries a forming unit as above described, the forming units being correspondingly disposed for multiple carton forming, see Figures 1 and 2, in which the forming units are generally designated at 97. With the driven movement of the chain, comprising the links 14 and 15, carrying the forming units, relatively stationary instrumentalities cooperate with the forming units in succession for the forming of cartons and will now be described.

Secured with the upper portion of the frame 1 intermediate its ends is a boxlike frame structure, comprising sides 101, 102 and a top of 103, through which the forming units pass in succession on the upper stretch of the chain comprising the links 14 and 15, the driven movement of the upper stretch of this chain being from left to right in Figure 1. See Figures 1, 2, 6, 7 and 12.

Laterally spaced rails 104 are secured at the upper portion 103 of the aforesaid box like structure and project therefrom in parallelism with the path of the forming units in the direction opposite the movement of the forming units on the upper stretch of their path. See Figures 6, 8, 9, 10 and 12. A transversely disposed horizontal rock shaft 105 is journaled in bores through the

projecting ends of the rails 104, and a pair of U-shaped arms 106 have corresponding legs thereof secured on opposite ends of the shaft 105 for rocking movement therewith, the opposite ends of the arms 106 being provided with carton blank engaging rollers 107.

A transversely disposed rock shaft 108 extends through and is pivotally mounted on the side 102, and an arm 109 is secured on the outer end of the shaft 108. A connecting rod 111 is pivotally connected with the arm 109 and the corresponding arm 106 for rocking the arms 106 with rocking movement of the shaft 108. A roller arm 112 is secured on the inner end of the shaft 108 and is so disposed to be engaged by an end of the stop bar 46 of each forming unit as it is moved along to effect carton forming movement of the arms 106 downwardly and in the direction of forming unit movement from the position shown in Figure 6 to that of Figure 9, the arm 112 releasing from each stop bar 46 to permit return of the arms 106 to their non-forming position as shown in Figure 6.

A stop pin 113 is secured on the side 102 and is engageable by the arm 112 to limit the arms 106 in their non-forming position, and a torsion spring 114 on the shaft 105 serves to yieldably urge the arms 106 into their non-forming position. Thus the arms 106 are oscillated to and from carton forming position as the forming units are moved in their defined path.

Two laterally spaced downwardly facing stationary forming plates 115 are secured on the extending portions of the rails 104 for oppositely cooperating with the rollers 107 of the arms 106, the arms 106 with their rollers 107 and the plates 115 being disposed on opposite sides of the paths of the top forming member 56 of the forming units and the plates 115 being disposed slightly above the side forming members 37, 38 and 39 and the forming members 62, 66 and 72. See Figures 8, 9, 10 and 11.

A laterally facing stationary form member 116 is fixed with the inner edge one of the form plates 115, and is disposed on the side of the path of the forming members 56 corresponding with the side of the forming units upon which the auxiliary inner form members 78 are disposed for oppositely cooperating with these auxiliary form members.

A downwardly facing cam plate 117 is secured with the forming plates 115 and lies in the path of the forming members 56, and a pair of downwardly facing cams 118 are secured on the top 103 and lie in the path of the forming members 56 and are spaced from the cam plate 117 in the direction of the movement of the forming units. See Figures 6, 8, 9 and 12. Cam rollers 119 are mounted on the outer ends of the forming members 56, and are engageable with the cam plate 117 and the cams 118 in the movement of the forming units to effect forming movement of the forming members 56, the cam plate 117 giving the forming members 56 a partial forming movement and the cams 118 giving the forming members 56 a complete forming movement for purposes hereinafter described.

An upwardly facing cam 121 is formed on the upper surface of the frame 1, and is engageable by cam roller arms 122 mounted on the inner end portions of the forming members 25 to actuate the forming members 25 on the pivot mountings 26 toward and into forming relation with the inner form members 24 of the forming units in

the movement of the forming units. See Figures 6, 8, 9 and 26.

Identical vertically spaced cams 123 are secured on the inside of the side 101, and are engageable by vertically spaced cam rollers 124 mounted on the forming members 38 of the forming units to actuate these forming members into forming position in the movement of the forming units. See Figures 7 and 12.

Identical vertically spaced cams 125 are secured on the inside of the side 102, and are engageable by vertically spaced cam rollers 126 mounted on the forming members 39 of the forming units to actuate these forming members into forming position in the movement of the forming units.

A cam 127 is secured on the inside of the side 101 and is engageable by cam roller arms 128 on the forming members 37 of the forming units to actuate these forming members into forming position in the movement of the forming units. See Figures 12, 14, 15.

A cam 129 is secured on the inside of the side 101 and is engageable by cam roller arms 131 mounted on the forming members 62 to actuate these forming members into forming position in the movement of the forming units. See Figures 12, 16 and 21.

A cam 132 is secured on the inside of the side 101 and is engageable by cam rollers 133 mounted on the forming members 66 of the forming units to actuate these forming members into forming position in the movement of the forming units. See Figures 18, 19 and 21.

A cam 134 is secured on the inside of the side 102 and is engageable by cam rollers 135 on the forming members 72 of the forming units to actuate these forming members into forming position in the movement of the forming units. See Figures 18 and 21.

A roller arm 136 is secured on the inside of the side 102 and is engageable by lugs 137 on the glue flap forming members 41 of the forming units to momentarily actuate these glue flap forming members into forming position in the movement of the forming units. See Figures 14, 15 and 21.

A stud 138 is secured on the inside of the side 102 and is engageable by the arms 89 of the lock levers 85 of the forming units to actuate the lock levers 85 of the forming units into locking position in the movement of the forming units. See Figures 12, 14 and 15.

A bracket 139 is secured on the base 2 and is provided with a stud 141 which is engageable by the arms 91 of the lock levers 85 of the forming units when on the lower path portions thereof to actuate the lock levers 85 into released position for the opening of the forming units preparatory to the removal of the formed and glued cartons from the forming units by any suitable means, not shown, and the removal of the formed cartons for filling and sealing as by a suitable conveyor generally indicated at 142. See Figures 1 and 5.

As shown, the carton blank on which the machine, hereinabove described, is adapted to operate is illustrated in Figure 30 and consists as follows:

The blank is formed of suitable material, such as cardboard, and is generally of the usual rectangular form. The blank consists of consecutively arranged side panels 143, 144, 145, and 146, a glue flap 147 along the outer side edge of the panel 146, upper end panels or flaps 148, 149, 151 and 152 extending from the upper ends of the side panels, and lower end panels or flaps 153,

154, 155 and 156 extending from the lower ends of the side panels.

The blank is preferably scored, as designated at 157 to facilitate the bending or forming of the panels or flaps thereof upon one another to form the carton, and, except as hereinafter described, the end panels or flaps of the blank are separated by cuts 158 aligned with the side edges of the side panels.

The blank is provided with a dispenser formation which consists as follows:

This dispenser formation ultimately forms a two-sided dispensing hopper, and is formed from material of the two adjoining upper end panels 151 and 152. This formation is formed by an arcuate cut 159 in the end flap 152 and a straight cut 161 extending along the inner edge of the end panel 152 forming a dispenser side flap 162 attached to the side of the adjoining end flap 151, and an arcuate perforation 163 on the end flap 151 adapted to be ultimately broken to form the other side flap of the hopper when it is desired to dispense from the formed carton. The arcuate edge of the side flap 162 is provided with a radial projection 164 adjacent the inner edge thereof to engage under the related end formation of the carton to limit outward movement of the hopper. The blank is preferably scored, as designated at 165, between the side flaps of the dispenser formation. The upper inner corner of the end flap 149 is cut away, as designated at 166, to provide with the portion of the end flap 152, cut away to form the dispenser side flap 162, a dispensing opening for the dispensing hopper.

In the formation of a carton from the blank illustrated in Figure 30 in the hereinbefore described machine, glue is initially applied to the proper portions of the blank, as indicated at 167 in Figure 30. These glued portions consist of a terminal side edge strip on the inner face of the side panel 143, the entire inner faces of the upper end flaps 148 and 149 and the inner face of the portion of the upper end flap 151 exterior of the arcuate perforation 163.

The operation of forming the one end and sides of the carton is, of course, effected previous to the setting of the glue, and the glued blank is fed into a forming unit while the unit is in carton blank receiving condition, hereinbefore described and as shown at the left in Figures 1, 6 and 7 and as shown in Figure 20. Referring to Figure 1, the glued carton blanks are successively fed into the open forming units as they initiate the upper stretch of the forming unit chain path in which the forming units travel to the right.

The blank is fed into an open forming unit with the outer edges of the lower end flaps 154 and 156 engaged on the rests 61 for vertical registry and with the several panels or flaps of the blank laterally registered with the corresponding forming members 37, 38, 25, 39, 41 and 56 of the forming unit, the inner face of the blank to which the aforesaid glue is applied opposing the inner form member 24.

With a carton blank so positioned thereon, a forming unit advances in the direction of the forming unit actuating or controlling instrumentalities hereinbefore described, which function as follows with the relative movement of a forming unit.

As a forming unit, carrying a carton blank, advances the cam 121, acting on the cam roller arm 122, actuates the outer side forming member 25 toward the opposing face of the inner form member 24, thus confining the side panel 145 75

therebetween. See Figure 8. It will be observed that, in this movement of the forming member 25, it carries with it the forming members 37, 38, 39, 41, 56, 62, 66 and 72. This movement of the member 25 also actuates the forming member 56 toward the opposing auxiliary inner form member 78, thus confining the hopper side flap forming portion of the upper end flap 151 therebetween, the carton blank being still in flat condition as illustrated in Figure 30.

Further advance of the forming unit effects almost simultaneous functioning of the arms 106 and their rollers 107 in opposing cooperation with the forming plates 115, the form member 116 in opposing cooperation with the auxiliary inner form member 78 in one plane, and the former member 56 in opposing cooperation with the form member 78 in a plane normal to said first mentioned plane, to effect the formation of the blank as shown in Figure 31. See Figures 9, 10 and 11.

To explain in detail, the arms 106 and their rollers 107 in their non-forming positions, as shown in Figure 6, clear the top of a blank as carried by a forming unit. As a forming unit, carrying a blank advances, the arms 106 are actuated into their forming position after the carried blank clears them, after which the arms 106 are actuated toward their forming position by the means hereinbefore described. In this movement the rollers 107 of the arms 106 engage the side panels of the blank adjacent their upper ends in opposite cooperation with the outer side forming members of a forming unit to permit the forming plates 115 to partially form the upper end flaps 148, 149 and 152 of the blank with reference to the corresponding side panels thereof.

Almost simultaneously with this action, forming movement of the top forming member 56 is initiated by the cam plate 117 to partially form the upper top flap 151, and the forming member 116 forms the dispenser side flap 162 with reference to the top flap 151. See Figures 10 and 11.

As the forming unit advances the dispenser side flap 162 is completely formed with reference to the upper top flap 151 and the upper end flaps 148, 149, 151 and 152 are partially formed, the partial forming of the flap 151 and the forming of the dispenser side flap 162 serving to dispose the inner edge of the dispenser side flap and the projection 164 below the fold between the top flap 152 and the side panel 146 so that placement of the dispenser side flap 162 inside the side panel 146 and of the projection 164 below the final plane of the top flap 152 is assured. This condition of the carton blank is illustrated in Figure 31 and occurs just previous to the forming unit position of Figure 9.

Further advance of the forming unit causes the cams 123 and 125 to effect forming movement of the forming members 38 and 39, the form plate 115 corresponding with the top flap 152 of the blank being provided with a cam portion 168 which disposes the flap 152 below the flap 149, so that, as the side panels 144 and 146 are formed by the forming members 38 and 39, the top flap 149 overlies the top flap 152. See Figures 7, 10, 14 and 15. Figures 33 and 34 illustrate the formation of side panels 144 and 146.

The formation of the side panel 146 is effected somewhat in advance of the formation of the side panel 144. As the side panel 146 is formed the cam 134 effects forming movement of the forming member 72 to complete the forming of the top flap

152, the forming member 72 returning to non-forming position before the side panel 144 is completely formed. See Figure 18.

As the side panel 144 is formed, the cam 132 effects forming movement of the forming member 66, after which the forming member 66 is returned to non-forming position. See Figures 18 and 19.

Further advance of the forming unit causes the roller arm 136 to effect forming movement and release of the glue flap forming member 41 and causes the cam 127 to effect forming movement of the side forming member 37, the forming member 37 forming the side panel 143 of the carton blank and the forming member 41 forming the side glue flap 147 of the carton blank. See Figures 14 and 15. The timing of the movements of the forming members 37 and 41 is such that the forming member 41 forms the glue flap previous to the completion of the side panel 143 and withdraws in time to clear the forming member 37 and yet insure the glue flap underlying the side panel 143. This operation completely forms the side panels of the carton, as shown in Figure 34, the forming member 37 pressing the glued surface of the side panel 143 onto the glue flap 147.

Further advance of the forming unit causes the stud 138 to engage the upper end of the arm 89 of the lock lever 85 and move this lock lever into locking engagement with the lock stud 87, see Figure 15, thus locking the side forming members 37, 38, 25 and 39 in forming position until the glue between the side panel 143 and glue flap 147 is set to secure them together.

Almost simultaneously with the movement of the forming member 37 into forming position, the cam 129 causes the forming member 62 to move into forming position, see Figure 16, thus completely forming the end flap 148, the termination of the cam plate 117 having permitted the top forming member 56 to move from its partial forming position toward its non-forming to insure its clearing the top flap 148 as it is formed. See Figure 6.

Further advance of the forming unit causes the cams 118 to move the top forming member 56 into its forming position to fully form the outer end of the carton, see Figure 17, the locking lever 92 engaging under the lock bar 59 to lock the member 56 in forming position until the glue between the top flaps 148, 149, 151 and 152 is set to secure them together.

Figure 36 illustrates the carton as formed in the machine, the bottom flaps 153, 154, 155 and 156 being disposed in the planes of the side panels of the carton preparatory to filling and sealing.

In the movement of the forming unit chain, the forming units function in succession and after the forming units are actuated for the forming operation as above described, they continue their movement in locked condition for an interval of sufficient length to maintain the carton formation until the glue is set to secure the carton formation.

After this glue setting interval of movement of the locked forming units, the stud 141 is engaged by the lower ends of the arms 91 of the lock levers 85 to actuate these lock levers into released position for the opening of the forming units, see Figures 1 and 5, the opening movement of each member 25 on the pivot mounting 26 causing the locking lever 92 to engage the projection 96 of the link 15 and to be moved thereby out of engagement with the lock bar 59, as shown in dotted lines in Figure 13, thus effecting opening movement of the top forming member 56.

The herein described machine practices the method of my invention in its preferred form and the method as well as its advantages are more or less obvious from the description of operation of the machine.

Generally, my method, of forming a carton from a blank having circumscribing side panels and end flaps adapted to form one end of the carton, consists in forming the circumscribing sides and said end of the carton in at least partially concomitant and preferably in predetermined relation, as shown, the circumscribing sides and said end of the carton being formed on an inner form means functioning in the formation of both the circumscribing sides and end of the carton.

Where the usual type of glue is used to finally secure the carton formation, the glue is initially applied to the proper portions of the blank to ultimately secure the carton formation, and then the carton formation is effected, as above described, previous to the setting of the glue, the resulting carton formation being maintained until the glue is set to secure the carton formation.

Where a dispenser formation is involved, as above described, including a dispenser side flap formed from material of one end flap and attached to the side of an adjoining end flap of end flaps adapted to form one end of the carton, the method consists in forming said dispenser side flap with reference to said adjoining end flap, the circumscribing sides and said end of the carton in at least partially concomitant and in predetermined relation, and completing the formation of said dispenser side flap with reference to said adjoining end flap and only partially forming said adjoining end flap previous to the completion of the formation of the circumscribing sides. Thus the dispenser formation is effected in a relatively positive and practical manner which does not interfere with the formation of the carton proper. The gluing phase as above referred to is also contemplated in the formation of dispenser type cartons.

Having thus described my invention, I do not wish to be limited to the precise details described, as changes may be readily made without departing from the spirit of my invention, but having thus described my invention, I claim as new and desire to secure by Letters Patent the following:

1. In a device adapted to receive a flat blank and to form therefrom the side walls and one end wall of a carton, the combination of a plurality of outer forming members, mounting means whereby said forming members are relatively movable to and from blank-receiving and forming positions, interior form means about which said forming members are adapted to at least partially form a carton from a blank, and a conveyor to move said outer forming members and said interior form means continuously.

2. In a device of the character described, the combination of a plurality of outer side forming members, an outer end forming member, pivotal mounting means whereby said side forming members are sequentially arranged and are relatively angularly movable facewise substantially in a common plane to and from a position in which the forming planes thereof are disposed at one side of a carton blank receiving plane and another position in which said forming planes are in forming position, additional pivotal mounting means whereby said end forming member is pivotally movable in a plane substantially normal to said first mentioned plane to and from a position in which the forming plane

thereof is disposed at said side of said receiving plane and another position in which its forming plane is in forming position, inner forming means oppositely cooperating with said forming members, and means to move said inner and outer forming members continuously during a carton forming operation.

3. In a device of the character described, the combination of a plurality of outer forming members, mounting means between said forming members whereby said forming members are relatively movable facewise to and from carton blank receiving and forming positions, additional forming means oppositely cooperating with said forming members, additional mounting means whereby said outer forming members are relatively movable as a unit to and away from said additional forming means, and conveyor means to move said outer forming members and said additional forming means continuously during a carton forming operation.

4. In a device of the character described, the combination of a plurality of outer forming members, pivotal mounting means between said forming members whereby said forming members are articulated for relative movement facewise to and from carton blank receiving and forming positions, inner forming means oppositely cooperating with said forming members, and additional pivotal mounting means associated with but one of said outer forming members whereby said outer forming members are relatively movable as a unit to and away from said inner forming member.

5. In a device of the character described, the combination of a plurality of outer forming members, pivotal mounting means between said forming members whereby said forming members are articulated for relative movement facewise to and from a position in which the forming planes thereof are disposed at one side of a carton blank receiving plane and another position in which said forming planes are in forming position, an inner form about which said forming members are adapted to at least partially form a carton from a received blank in their relative movement to said forming position, and additional mounting means associated with but one of said outer forming members whereby said outer forming members are relatively movable as a unit to and away from said inner form.

6. In a device of the character described, the combination of a plurality of outer side forming members, pivotal mounting means between said forming members whereby said forming members are articulated for relative movement facewise to and from carton blank receiving and forming positions, an outer end forming member, additional pivotal mounting means between said end forming member and one of said side forming members whereby these forming members are articulated for relative movement facewise to and from carton blank receiving and forming positions, an inner form oppositely cooperating with said forming members, further additional mounting means associated with said one side forming member whereby said outer forming members are relatively movable as a unit to and away from said inner form, and conveyor means to move said outer forming members and said inner form continuously past a plurality of stationary cams.

7. In a device of the character described, the combination of a plurality of outer side forming members, pivotal mounting means between said forming members whereby said forming

members are articulated for relative movement facewise to and from carton blank receiving and forming positions, an outer end forming member, additional pivotal mounting means between said end forming member and one of said side forming members and disposed on an axis transverse to said first mentioned pivotal mounting means whereby these forming members are articulated for relative movement facewise to and from carton blank receiving and forming positions, an inner form oppositely cooperating with said forming members, and further additional pivotal mounting means associated with said one side forming member and disposed on an axis transverse to said first mentioned pivotal mounting means whereby said forming members are relatively movable as a unit to and away from said inner form.

8. In a device adapted to receive a flat sheet and form therefrom the side wall and one end of a carton, the combination of a forming unit comprising a plurality of forming members relatively movable to and from carton forming position, means mounted for relative defined path movement with reference to said unit and adapted to effect relative carton forming movement of said forming members, and conveyor means to move said forming unit continuously past a plurality of cams.

9. In a device adapted to receive a flat sheet and form therefrom the side walls and one end of a carton, the combination of a forming unit comprising a plurality of forming members relatively movable to and from carton forming position, means mounted for relative defined path movement with reference to said unit and adapted to effect carton forming movement of said forming members with said relative defined path movement, and conveyor means to move said forming unit continuously.

10. In a device of the character described, the combination of a forming unit comprising inner forming means and a plurality of outer forming members relatively movable with reference to each other and as a group with reference to said inner forming means to and from carton forming position, means mounted for relative defined path movement with reference to said unit and adapted to effect said relative group movement and said relative outer forming member movement into carton forming position in timed relation in said relative defined path movement, and conveyor means to move said forming unit continuously.

11. In a device adapted to receive a flat blank and form therefrom the side walls and one end of a carton, the combination of a forming unit comprising a plurality of forming members relatively movable to and from forming position, means mounted for relative defined path movement with reference to said unit and adapted to effect relative carton forming movement of said forming members, additional forming means mounted for said relative defined path movement with reference to said unit and adapted to cooperate with said forming members and said last mentioned means for the formation of a carton, and said forming members being in continuous movement during the forming operation, and means to convey said forming unit and said additional forming means past a plurality of stationary cams.

12. In a device of the character described, the combination of a forming unit comprising a plurality of forming members relatively movable to

and from carton forming position, means mounted for relative defined path movement with reference to said unit and adapted to effect carton forming movement of said forming members with said relative defined path movement, additional forming means mounted for said relative defined path movement with reference to said unit and adapted to cooperate with said forming members and said last mentioned means with said relative defined path movement for the formation of a carton, and means to move said forming unit and additional forming means at a substantially constant velocity.

13. In a device of the character described, the combination of a forming unit comprising a plurality of forming members relatively movable to and from carton forming position, means mounted for relative defined path movement with reference to said unit and adapted to effect relative carton forming movement of said forming members, releasable locking means for automatically locking said forming members in carton forming position upon positioning of said forming members in forming position by said first mentioned means, means mounted for said relative defined path movement with reference to said unit and adapted to release said locking means subsequent to the locking thereof in said relative defined path movement, and a conveyor for said forming unit.

14. In a device of the character described, the combination of a forming unit comprising a plurality of forming members relatively movable to and from carton forming position, means mounted for relative defined path movement with reference to said unit and adapted to effect relative carton forming movement of said forming members in a portion of said path, releasable locking means carried with said unit and actuatable for locking said forming members in carton forming position, means mounted for said relative defined path movement with reference to said unit and adapted to lock said forming members in forming position as effected by said first mentioned means, means mounted for said relative defined path movement with reference to said unit and adapted to release said locking means subsequent to said locking thereof in said relative defined path movement, and means to move said forming members continuously during a carton forming operation.

15. In a device of the character described, the combination of a forming unit comprising a plurality of forming members relatively movable to and from forming position, means to move said forming unit at a substantially constant velocity during a carton forming operation, means mounted for relative defined path movement with reference to said unit and adapted to effect relative carton forming movement of said forming members, additional forming means mounted for said relative defined path movement with reference to said unit and adapted to cooperate with said forming members and said last mentioned means for the formation of a carton, releasable locking means for locking said forming members in carton forming position upon positioning of said forming members in forming position by said first mentioned means, and means mounted for said relative defined path movement with reference to said unit and adapted to release said locking means subsequent to the locking thereof in said relative defined path movement.

16. In a device of the character described, the combination of a forming unit comprising inner

form means and a plurality of outer forming members relatively movable with reference to each other and as a group with reference to said inner forming means to and from carton forming position, means mounted for relative defined path movement with reference to said unit and adapted to effect said relative group movement and said relative outer forming member movement into carton forming position in timed relation in said relative defined path movement. additional forming means mounted for said relative defined path movement with reference to said unit and adapted to cooperate with said forming members and said last mentioned means for the formation of a carton, and a conveyor to move said forming unit past a plurality of cams.

17. In a device of the character described, the combination of a forming unit comprising inner form means and a plurality of outer forming members relatively movable with reference to each other and as a group with reference to said inner forming means to and from carton forming position, means mounted for relative defined path movement with reference to said unit and adapted to effect said relative group movement and said relative outer forming member movement into carton forming position in timed relation in said relative defined path movement. additional forming means mounted for said relative defined path movement with reference to said unit and adapted to cooperate with said forming members and said last mentioned means for the formation of a carton, releasable locking means for locking said forming members in carton forming position upon positioning of said forming members in forming position by said first mentioned means, means mounted for said relative defined path movement with reference to said unit and adapted to release said locking means subsequent to the locking thereof in said relative defined path movement, and a conveyor to move said forming members continuously during a carton forming operation.

18. In a device of the character described, the combination of a forming unit comprising a plurality of forming members relatively movable to and from carton forming position, means mounted for relative defined path movement with reference to said unit and adapted to effect relative carton forming movement of said forming members. additional forming means including a forming member mounted for said relative defined path movement and also mounted for movement into and out of forming position, means for actuating said last mentioned forming member into and out of its forming position for cooperation with said plurality of forming members, and conveyor means to move said forming members continuously.

19. In a device of the character described, the combination of a forming unit comprising a plurality of forming members relatively movable to and from carton forming position, means mounted for relative defined path movement with reference to said unit and adapted to effect relative carton forming movement of said forming members. additional forming means mounted for said relative defined path movement with reference to said unit and comprising forming members oppositely cooperating with said forming members and at least one of which is for movement into and out of forming position, means for actuating said last mentioned movable forming member into and out of forming position for cooperation with said first mentioned plurality of forming mem-

bers, and a conveyor for moving said forming members continuously during a carton forming operation.

20. In a device of the character described, the combination of a forming unit comprising a plurality of forming members relatively movable to and from carton forming position, means mounted for relative defined path movement with reference to said unit and adapted to effect relative carton forming movement of said forming members with said relative defined path movement, additional forming means mounted for said relative defined path movement with reference to said unit and comprising oppositely cooperating forming members one of which is mounted for pivotal movement on an axis transverse to said relative defined path movement into and out of forming position, means for effecting actuation of said last mentioned movable forming member into and out of forming position with said relative defined path movement, and means to move said forming members continuously past a plurality of cams.

21. In a device of the character described, the combination of a plurality of forming units each comprising a plurality of forming members relatively movable to and from carton forming position, mounting means for said units whereby said units are spaced along a defined path and arranged correspondingly with reference thereto, means mounted for relative movement with reference to said units along said defined path and adapted to effect relative carton forming movement of the forming members of said units sequentially in said relative defined path movement, and means to move said forming members continuously at a substantially constant velocity.

22. In a device of the character described, the combination of a plurality of forming units each comprising a plurality of forming members relatively movable to and from carton forming position, mounting means for said units whereby said units are spaced along a defined path and arranged correspondingly with reference thereto, means mounted for relative movement with reference to said units along said defined path and adapted to effect relative carton forming movement of the forming members of said units sequentially in said relative defined path movement, additional forming means mounted for said relative defined path movement with reference to said units and adapted to cooperate with said forming members of each unit sequentially and said second mentioned means in said relative defined path movement, and conveyor means to move said forming members continuously past a plurality of stationary cams.

23. In a device of the character described, the combination of a plurality of forming units each comprising a plurality of forming members relatively movable to and from carton forming position, mounting means for said units whereby said units are spaced along a defined path and arranged correspondingly with reference thereto, means mounted for relative movement with reference to said units along said defined path and adapted to effect relative carton forming movement of the forming members of said units sequentially in said relative defined path movement, releasable locking means for automatically locking said forming members of each unit in forming position upon positioning of said forming members in forming position by said second mentioned means, means mounted for said rela-

tive defined path movement with reference to said units and adapted to release said locking means individually with reference to each unit subsequent to the locking thereof in said relative defined path movement, and a conveyor to provide continuous motion for said forming members.

24. In a device of the character described, the combination of a plurality of forming units each comprising a plurality of forming members relatively movable to and from carton forming position, means to convey said forming units past a plurality of stationary cams, mounting means for said units whereby said units are spaced along a defined path and arranged correspondingly with reference thereto, means mounted for relative movement with reference to said units along said defined path and adapted to effect relative carton forming movement of the forming members of said units sequentially in said relative defined path movement, additional forming means mounted for said relative defined path movement with reference to said units and adapted to cooperate with said forming members of each unit sequentially and said second mentioned means in said relative defined path movement, releasable locking means for automatically locking said forming members of each unit in forming position upon positioning of said forming members in forming position by said second mentioned means, means mounted for said relative defined path movement with reference to said units and adapted to release said locking means individually with reference to each unit subsequent to the locking thereof in said relative defined path movement.

25. In a device of the character described, the combination of a plurality of forming members, mounting means whereby said forming members are relatively movable to and from carton blank receiving and forming positions, additional forming means oppositely cooperating with said forming members, further additional forming means operative to effect a superposed relation of certain carton blank portions in cooperation with at least one of said forming members, and conveyor means to move said forming members continuously during a carton forming operation.

26. In a device of the character described, the combination of a plurality of outer forming members, pivotal mounting means whereby said forming members are relatively angularly movable facewise to and from a position in which the forming planes thereof are disposed on one side of a carton blank receiving position and another position in which said forming planes are in forming position, inner forming means oppositely cooperating with said forming members, at least one additional forming member movably mounted on one of said forming members and operative to effect a superposed relation of certain carton blank portions in cooperation with at least one of the remainder of said forming members, and means to move said forming members at a substantially constant velocity throughout a carton forming operation.

27. In a device of the character described, the combination of a plurality of outer forming members, pivotal mounting means whereby said forming members are sequentially arranged and are relatively angularly movable facewise substantially in a common plane to and from carton blank receiving and forming positions, an interior form about which said forming mem-

bers are adapted to form circumscribing sides of a carton, inner form means oppositely cooperating with said forming members, a glue flap engaging means operative to effect superposed relation of a terminal glue flap of the carton blank with the opposite terminal carton side portion of the carton blank in cooperation with the forming member corresponding with said terminal side portion of the carton blank, and a conveyor to move said forming members at a substantially constant velocity throughout a carton forming operation.

28. In a device of the character described, the combination of a plurality of forming members, pivotal mounting means whereby said forming members are sequentially arranged and are relatively angularly movable facewise substantially in a common plane to and from a position in which the forming planes thereof are disposed on one side of a carton blank receiving plane to another position in which said forming planes are in forming position, an inner form about which said forming members are adapted to form circumscribing sides of a carton, and a glue flap engaging member pivotally mounted on one terminal member of said forming members for angular movement substantially in the plane of relative movement of said forming members and operative to effect superposed relation of a terminal glue flap of the carton blank with the opposite terminal carton side portion of the carton blank in cooperation with the other terminal member of said forming members.

29. In a device of the character described, the combination of a plurality of outer side forming members, an outer end forming member, mounting means whereby said forming members are relatively movable to and from carton blank receiving and forming positions, inner forming means oppositely cooperating with said forming members, additional forming means operative to effect a superposed relation of certain carton blank portions in cooperation with at least one of said side forming members, further additional forming means operative to effect a superposed relation of certain other carton blank portions in cooperation with said end forming member, and means to move said forming members continuously along a substantially straight line throughout the carton forming operation.

30. In a device of the character described, the combination of a plurality of outer side forming members, an outer end forming member, pivotal mounting means whereby said side forming members are sequentially arranged and are relatively angularly movable facewise substantially in a common plane to and from a position in which the forming planes thereof are disposed on one side of a carton blank receiving plane to another position in which said forming planes are in forming position, additional pivotal mounting means whereby said end forming member is pivotally movable in a plane substantially normal to said first mentioned plane to and from a position in which the forming plane thereof is disposed at said side of said receiving plane and another position in which its forming plane is in forming position, inner forming means oppositely cooperating with said forming members, a glue flap engaging member pivotally mounted on one terminal member of said side forming members and operative to effect superposed relation of a terminal glue flap of the carton blank with the opposite terminal carton side portion of the carton blank in cooperation with the other terminal

member of said side forming members, and a plurality of carton end flap engaging members pivotally mounted on different of said side forming members and operative to effect superposed relation of related end forming flaps of the carton blank in cooperation with said end forming member.

31. In a device of the character described, the combination of inner form means including an auxiliary box forming member, said member being mounted on said inner form and provided with mounting means for permitting its projection beyond the end or face of the inner form and for retraction into a position substantially flush with said form.

32. In a device of the character described, the combination of an inner form member provided with a recess, and an auxiliary inner box forming member mounted on said inner form member for movement to and from a position projecting from said inner form member and a retracted position substantially within said recess.

33. In a device of the character described, the combination of inner form means including an auxiliary inner box forming member mounted on said inner formed means for movement to and from a position projecting from said inner form means, and means yieldingly urging said auxiliary form means into projecting position.

34. In a device of the character described, the combination of a multi-sided inner form member provided with a recess in one side thereof and opening on an adjoining side thereof, and an auxiliary inner form member pivotally mounted on said inner form member on an axis normal to said first mentioned side and disposed in the region of said second mentioned side and another side of said inner form member adjoining said first mentioned two sides for movement to and from a position projecting from said second mentioned side and a retracted position substantially within said recess.

35. In a device of the character described, the combination of a multi-sided inner form member provided with a recess in one side thereof and opening on an adjoining side thereof, an auxiliary inner form member pivotally mounted on said inner form member on an axis normal to said first mentioned side and disposed in the region of said second mentioned side and another side of said inner form member adjoining said first mentioned two sides for movement to and from a position projecting from said second mentioned side and a retracted position substantially within said recess, stop means limiting projecting movement of said auxiliary form member, and spring means yieldably urging said auxiliary form member into projecting position.

36. In a device of the character described, the combination of inner form means including an auxiliary inner box forming member mounted on said inner form means and adapted for movement to and from projecting and retracted positions, and outer forming means oppositely cooperating with said inner form means including said auxiliary inner form member.

37. In a device of the character described, the combination of inner form means including an auxiliary inner form member mounted for movement to and from projecting and retracted positions, and outer forming means oppositely cooperating with said inner form means and including two relatively movable forming members oppositely cooperating with said auxiliary form member in different planes.

38. In a device of the character described, the combination of inner form means including an auxiliary form member mounted for movement to and from projecting and retracted positions, means yieldably urging said auxiliary form member into projecting position, and outer forming means oppositely cooperating with said inner form means and including two relatively movable forming members oppositely cooperating with said auxiliary form member in different planes and one forming member of which is adapted to actuate said auxiliary form member into retracted position.

39. In a device of the character described, the combination of a multi-sided inner form member provided with a recess in one side thereof and opening on an adjoining side thereof, an auxiliary inner form member pivotally mounted on said inner form member on an axis normal to said first mentioned side and disposed in the region of said second mentioned side and another side of said inner form member adjoining said first mentioned two sides for movement to and from a position projecting from said second mentioned side and a retracted position substantially within said recess, and outer forming means oppositely cooperating with said inner form members and including two forming members oppositely cooperating with said auxiliary form member in planes normal to each other and one forming member of which is movably mounted and adapted to actuate said auxiliary inner form member into retracted position.

40. In a device of the character described, the combination of inner form means, a plurality of relatively movable outer forming members oppositely cooperating with said inner form means, conveyor means to move said forming members and said form means continuously, means for effecting forming movement of said outer forming members in at least partially concomitant relation.

41. In a device of the character described, the combination of inner form means, a plurality of relatively movable outer forming members oppositely cooperating with said inner form means and including side and end forming members, means for effecting forming movement of said forming members in at least partially concomitant and in predetermined relation, and means to move said inner form means and said outer forming members at a substantially constant velocity past a plurality of cams.

42. In a device of the character described, the combination of inner form means, a plurality of relatively movable outer side forming members and a plurality of relatively movable outer end forming members oppositely cooperating with said inner form means, means for effecting forming movement of said side and end forming members in at least partially concomitant and in predetermined relation, and means to move said inner form means and said forming members together during a carton forming operation.

43. In a device of the character described, the combination of inner form means including an auxiliary box forming member mounted for movement to and from projecting and retracted positions, a plurality of relatively movable outer forming members oppositely cooperating with said inner form member, and means for effecting forming movement of said outer forming members in at least partially concomitant and in predetermined relation.

44. In a device of the character described, the

combination of inner form means including an auxiliary form member mounted for movement to and from projecting and retracted positions, a plurality of relatively movable outer forming members oppositely cooperating with said inner form means, said outer forming members including two relatively movable forming members oppositely cooperating with said auxiliary form member in different planes and one of which is adapted to actuate said auxiliary form member into its retracted position, and means for effecting forming movement of said outer forming members in at least partially concomitant and in predetermined relation.

45. In a device of the character described, the combination of inner form means including an auxiliary form member mounted for movement to and from projecting and retracted positions, outer forming means oppositely cooperating with said inner form means and comprising a plurality of relatively movable side forming members and a plurality of relatively movable end forming members one of which oppositely cooperates with said auxiliary form member in one plane adapted to actuate the same into retracted position, an additional forming member relatively movable with reference to said inner form means and oppositely cooperating with said auxiliary form member in the plane of movement of said auxiliary form member, and means for effecting forming movement of said side and end forming members and said additional forming member relative to said inner forming means in at least partially concomitant and in timed relation.

46. The method of forming a carton from a blank having circumscribing side panels, end flaps adapted to form one end of the carton and a dispenser formation including a dispenser side flap formed from material of one of said end flaps and attached to the side of an adjoining end flap, which consists in forming said dispenser side flap with reference to said adjoining end flap, said circumscribing sides and said end of the carton in at least partially concomitant and in predetermined relation, and completing the formation of said dispenser flap with reference to said adjoining end flap and only partially forming said adjoining end flap previous to the completion of the formation of said circumscribing sides.

47. The method of forming a carton from a blank having circumscribing side panels, end flaps adapted to form one end of the carton and a dispenser formation including a dispenser side flap formed from material of one of said end flaps and attached to the side of an adjoining end flap, which consists in forming said dispenser side flap with reference to said adjoining end flap, said circumscribing sides and said end of the carton in at least partially concomitant and in predetermined relation, and completing the forming of said dispenser side flap with reference to said adjoining end flap and only partially forming said adjoining end flap previous to the completion of the formation of said circumscribing sides and completing the formation of said adjoining end flap after the completion of the formation of said circumscribing sides and the forming of other of said end flaps in underlying relation with said adjoining end flap.

48. The method of forming a carton from a blank having circumscribing side panels, a side glue flap, end flaps adapted to form one end of the carton and a dispenser formation including a dispenser side flap formed from material

of one of said end flaps and attached to the side of an adjoining end flap, which consists in initially applying glue to the proper portions of the blank to ultimately secure said side panels, glue flap and end flaps in carton forming relation, then forming said dispenser side flap with reference to said adjoining end flap, said circumscribing sides and side glue flap and said end of the carton in at least partially concomitant and in predetermined relation and previous to the setting of said glue, and maintaining the resulting carton formation until said glue is set to secure the carton formation.

49. The method of forming a carton from a blank having circumscribing side panels, a side glue flap, end flaps adapted to form one end of the carton and a dispenser formation including a dispenser side flap formed from material of one of said end flaps and attached to the side of an adjoining end flap, which consists in initially applying glue to the proper portions of the blank to ultimately secure said side panels, glue flap and end flaps in carton forming relation, then forming said dispenser side flap with reference to said adjoining end flap, said circumscribing sides and said side glue flap and said end flaps of the carton in at least partially concomitant and in predetermined relation, and completing the forming of said dispenser side flap with reference to said adjoining end flap and only partially forming said adjoining end flap previous to the completion of the formation of said circumscribing sides and completing the formation of said adjoining end flap after the completion of the formation of said circumscribing sides and the forming of other of said end flaps in underlying relation with said adjoining end flap, and maintaining the resulting carton formation until said glue is set to secure the carton formation.

50. In a device of the character described, the combination of a plurality of sets of inner and outer forming members, means for moving said sets continuously, means for separating the outer forming members from the inner forming members to receive flat blanks, and means for operating the outer forming members to form the blanks around the inner members during continuous movement of said members.

51. In a device for forming a carton from a flat blank, the combination comprising: A plurality of sets of inner and outer forming members, means to move said sets continuously, means to separate the outer forming members from the inner forming members to receive flat blanks, means to operate the outer forming members to form the blanks around the inner members, and means to retain said cartons under pressure until their adhesive sets.

52. In a device for forming cartons, the combination comprising: Outer forming members having a plurality of articulated plates, inner forming members coacting with said outer forming members to form a carton from a flat blank, means to separate said inner and outer forming members to receive said blank, and means to move said inner and outer forming members continuously during a carton forming operation.

53. In a device for forming cartons, the combination comprising: An outer forming member having a plurality of articulated plates, mounting means whereby said outer forming member is movable outwardly to receive a carton blank and inwardly to a carton forming position, an inner forming member oppositely cooperating with said outer forming member to form a car-

ton from said blank, and means to move said inner and outer members continuously during a carton forming operation.

5 54. In a device of the character described, the combination comprising: A plurality of sets of inner and outer forming members, means for moving said sets continuously, means for angu-
10 larly separating said inner and outer forming members to receive flat blanks, means to move said outer forming members to clamp said blanks against said inner members, and means to oper-
15 ate said forming members to at least partially form cartons from said blanks during the continuous movement of said members.

15 55. In a carton making machine, the combination of inner and outer forming members, each outer forming member comprising a plurality of articulated plates; means for separating the outer forming members from the inner forming mem-
20 bers to receive flat blanks, and means for operating the outer forming members to form the blanks around the inner forming members.

25 56. In a carton making machine, the combination of inner and outer forming members, means to move said inner and outer forming members together, each outer forming member comprising a plurality of articulated plates, means for separating the outer forming members from the inner forming members to receive flat blanks,
30 and means for operating the outer forming members to form the blanks around the inner forming members.

57. In a carton making machine, the combination of inner and outer forming members, each outer forming member comprising a plurality of articulated plates, means for separating the outer forming members from the inner forming mem- 5
bers to receive flat blanks, means for operating the outer forming members to form the side walls and at least one end wall of a carton from said blank, and means to retain said cartons under pressure until their adhesive sets. 10

58. In a carton making machine, the combination of inner and outer forming members, each outer forming member comprising a plurality of articulated plates, means for separating the outer forming members from the inner forming mem- 15
bers to receive flat blanks, and means for operating the outer forming members to form from said blanks the side walls and at least one end wall of cartons.

59. In a carton making machine, the combination of inner and outer forming members, each outer forming member comprising a plurality of articulated plates, means to move said inner and outer forming members together, means for separating the outer forming members from the inner forming members to receive flat blanks, 20
and means for operating the outer forming members to form from said blanks the side walls and one end wall of cartons. 25

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