Feb. 12, 1952 J. J. WETZLER 2,585,201

CARTON SETUP MACHINE

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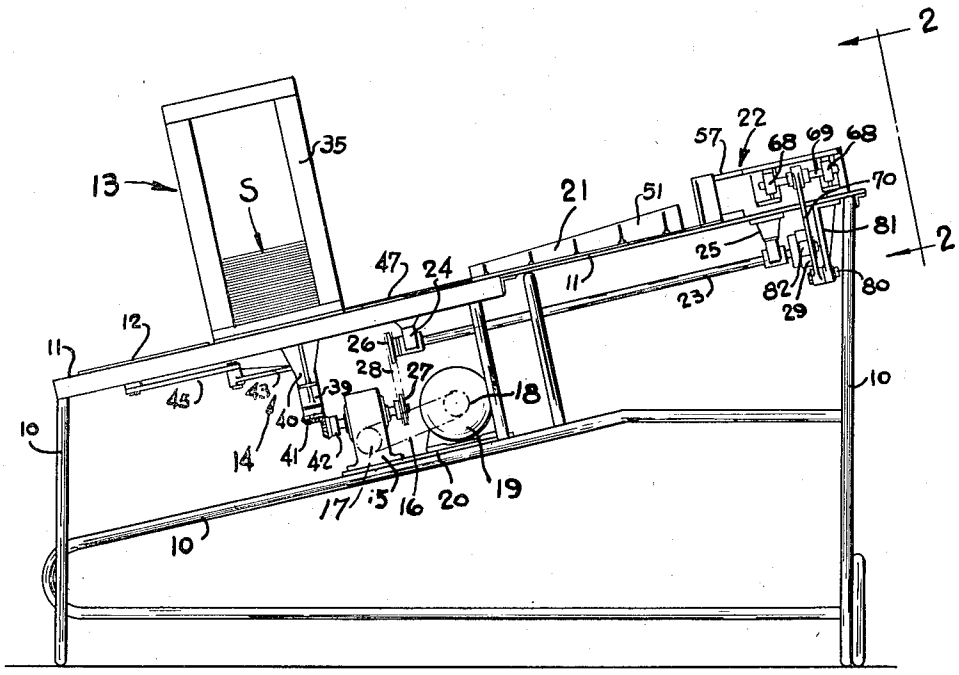


Fig 1

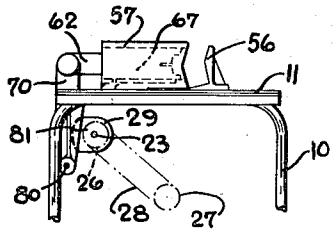


Fig 2

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Feb. 12, 1952 J. J. WETZLER 2,585,201

CARTON SETUP MACHINE

Filed May 7, 1948 6 Sheets-Sheet 2

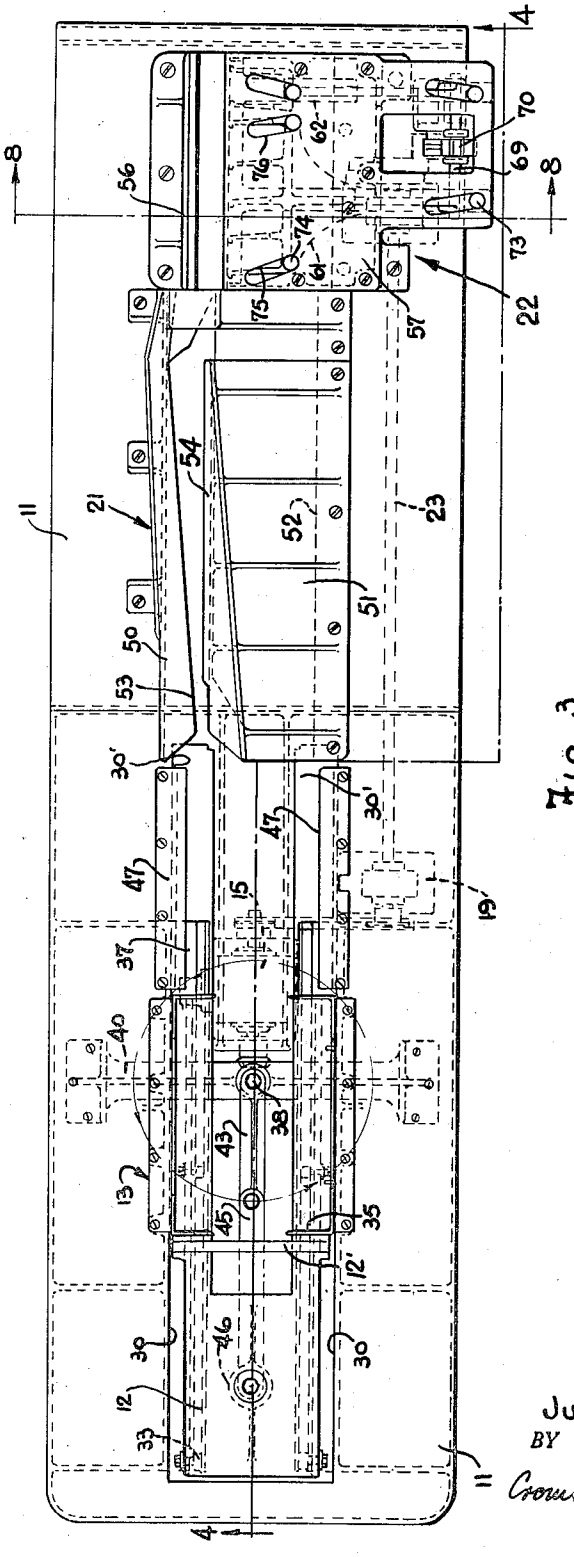


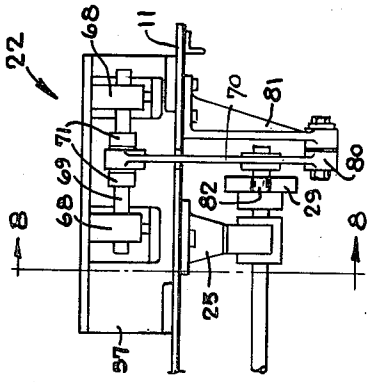
Fig 3

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CARTON SETUP MACHINE

Filed May 7, 1948 6 Sheets-Sheet 3



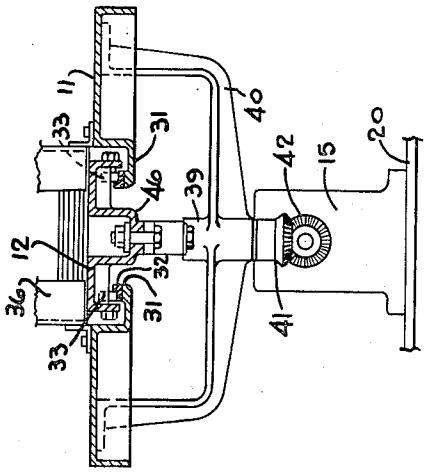


Fig. 5

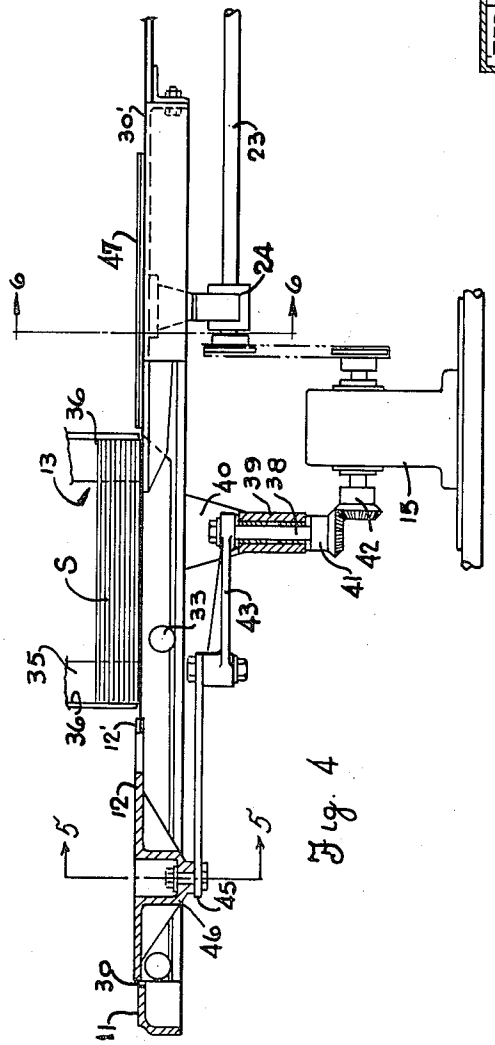


Fig. 4

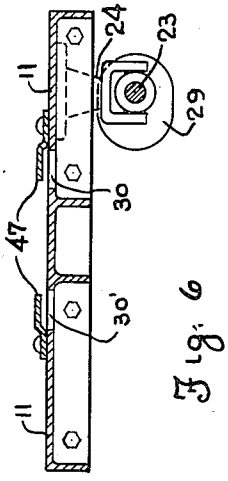


Fig. 6

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Feb. 12, 1952 J. J. WETZLER 2,585,201

CARTON SETUP MACHINE

Filed May 7, 1948 6 Sheets-Sheet 4

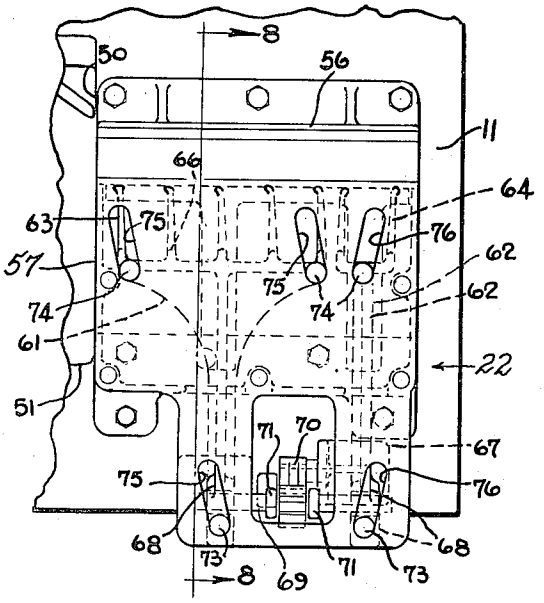


Fig 7

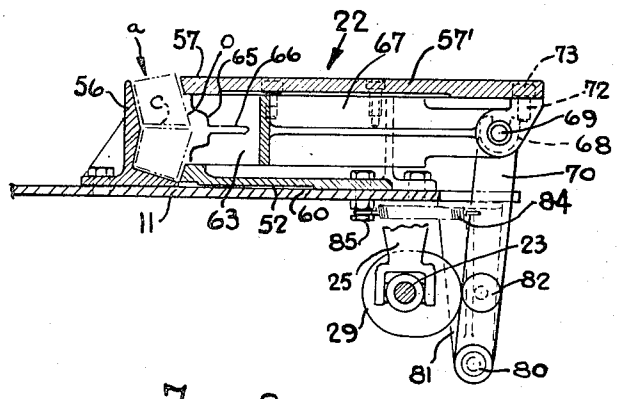


Fig 8

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Feb. 12, 1952 J. J. WETZLER 2,585,201

CARTON SETUP MACHINE

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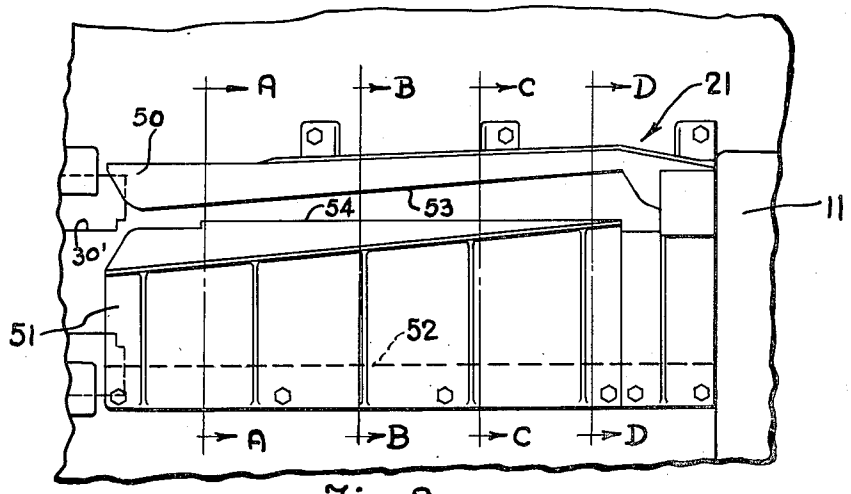


Fig 9

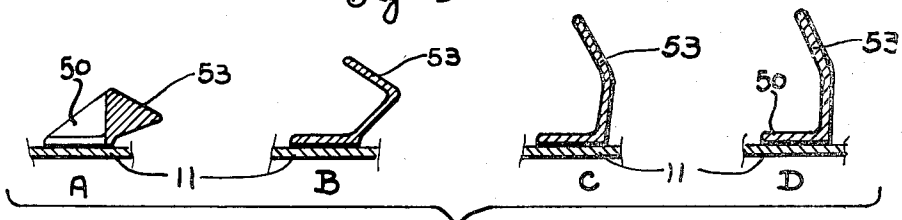


Fig 10

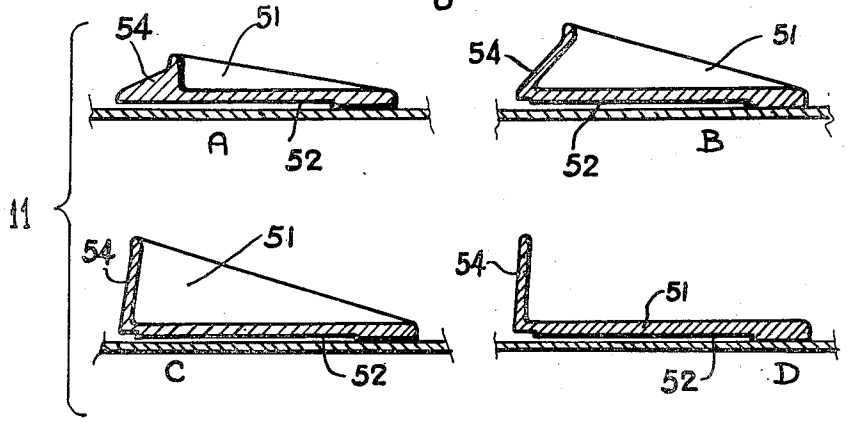


Fig 11

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Feb. 12, 1952 J. J. WETZLER 2,585,201

CARTON SETUP MACHINE

Filed May 7, 1948 6 Sheets-Sheet 6

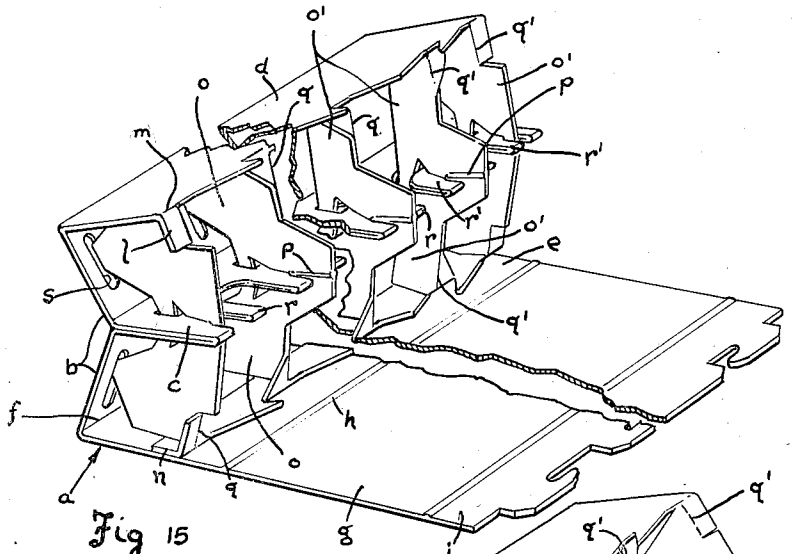


Fig 15

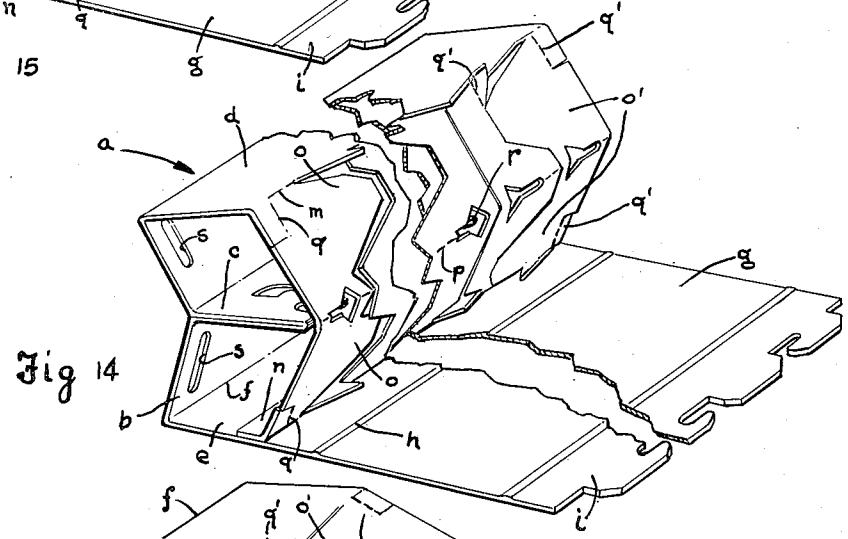


Fig 14

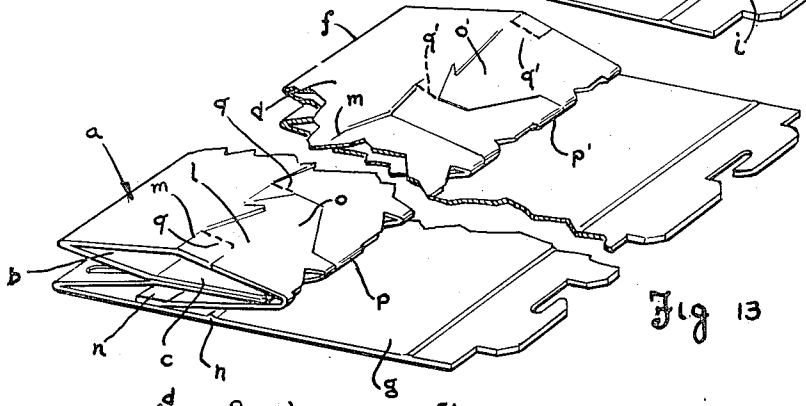


Fig 13

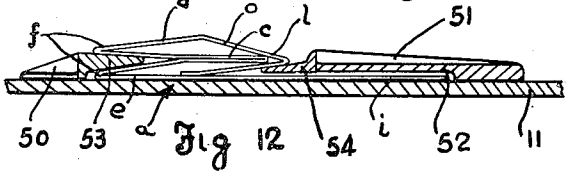


Fig 12

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Patented Feb. 12, 1952

2,585,201

UNITED STATES PATENT OFFICE

2,585,201

CARTON SETUP MACHINE

Justin J. Wetzler, Chicago, Ill., assignor to Shellmar Products Corporation, Chicago, Ill., a corporation of Delaware

Application May 7, 1948, Serial No. 25,740

10 Claims. (Cl. 93—37)

1

The present invention pertains to an improved machine for setting up collapsible cellular paperboard egg cartons from a flat, knocked-down condition for storage or shipment to a fully erected condition, ready for reception of their intended contents.

Although the apparatus, in accordance with the general principles of the invention, is suitable for the manipulation of various flexible cardboard cartons of the one-piece, swingable partition type, one which the illustrated embodiment of the machine is specially designed to handle is illustrated in the patent to John W. Cox, No. 2,387,314, of October 23, 1945. This particular carton is characterized by double paneled, flexible bottom section having front and rear side walls connected to its opposite, outer margins and a vertical partition extending longitudinally above the junction of the bottom section panels, along a medial line between said walls. Sets of vertically swingable transverse partitions are integrally hinged to the aforesaid side walls and, in the inoperative position of said partitions, i. e., in the flat, knocked-down condition of the carton, the two cross partitions of each set are prefolded onto one another along a longitudinal medial line paralleling the longitudinal partition. In erecting the cross partitions to operative upstanding position relative to the bottom, after the body of the carton has been preliminarily shaped to a generally quadrilateral outline, they are swung downwardly about their hinges, being guided in this movement by certain provisions in the longitudinal partition, and are engaged with the bottom of the carton to hold them in their operative, erect form. In this position said cross partitions subdivide the spaces on opposite sides of the longitudinal partition into individual egg receiving cells.

It is a characteristic of the Cox-type carton that the aforesaid cross partitions are separated into two sets, the partitions of one set being hinged to the carton side walls to swing downwardly in one angular direction, whereas the partitions of the other set swing downwardly in the opposite angular direction.

It is an object of the present invention to provide an automatic apparatus which is operable at sufficiently high speed and reliability to adapt the same for supplying erected paperboard cartons of the above general type for the needs of a modern high capacity, commercial egg room; which is sufficiently simple in the details and arrangements of its parts for production and operation at a reasonable cost; which does not

2

require frequent adjustments and repairs; and which eliminates likelihood of carton damage in operation.

A more specific object is to provide a carton set-up apparatus of the type described having an improved feeding device adapted to successively forward a series of flat, knocked-down cartons by an intermittent motion from a supply thereof through certain shaping and erecting instrumentalities, in which the feeding action is transmitted through said series of advancing cartons themselves, thereby greatly simplifying the carton feed arrangements.

Another object is to provide a machine of the foregoing character including a reciprocatory shuttle deriving its power from a very simple, gear-driven, articulated linkage, in which said shuttle has improved anti-friction guiding means to direct the same in its travel.

In another aspect of the invention, it is an object to provide a carton set-up machine including an improved partition set-up assembly, shown in the illustrated form of the machine as being disposed in receiving relation to a chute or plow by which the body of the carton is preliminarily shaped to generally quadrilateral form, which assembly includes a pair of transversely movable partition erecting elements and means for imparting individual, opposite components of movement thereto at an angle to their transverse movement.

Another specific object is to provide a partition set-up assembly of the type referred to in the preceding paragraph, including a pair of partition erecting members having the aforesaid composite, transverse and angular movements, which movements are preferably controlled by coacting fixed and movable cam members associated with said members and with another portion of the assembly, whereby said members are simultaneously moved as a unit in their partition positioning operation.

Yet another object of the invention is to provide a partition set-up assembly of the foregoing type, including a simplified drive therefor and a simplified operating connection for said drive to the carton advancing or like mechanism of a machine with which said assembly is associated.

The foregoing statements are indicative in a general way of the nature of the invention, but other and more specific objects will be apparent to those skilled in the art upon a full understanding of the construction and operation of the device.

A single embodiment of the invention is pre-

sented herein for purpose of exemplification, but it will be appreciated that the invention is susceptible of incorporation in other modified forms coming equally within the scope of the appended claims.

In the drawings,

Fig. 1 is a view in side elevation of a carton set-up apparatus according to the invention, illustrating the general character and relationship of the component parts and devices thereof;

Fig. 2 is a fragmentary view in end elevation, viewed from line 2—2 of Fig. 1;

Fig. 3 is a top plan view of the apparatus of Fig. 1, further illustrating the general arrangement of the components of the machine;

Fiig. 4 is a view in longitudinal vertical section through the apparatus, approximately along broken section line 4—4 of Fig. 3, illustrating certain details of the drivingly coupled carton feed and partition set-up devices of the apparatus, certain other details relating to the body forming provisions of the machine being omitted in the interest of simplicity;

Figs. 5 and 6 are, respectively, views in cross section along lines 5—5 and 6—6 of Fig. 4, further showing certain details of the carton feed and set-up provisions;

Fig. 7 is a fragmentary top plan view of the partition set-up device of the machine, indicating the mode of actuating the individual partition set-up elements thereof;

Fig. 8 is a view in transverse vertical section, along a line generally corresponding to line 8—8 of Figs. 3, 4 and 7, further illustrating specific features of the partition set-up device and the provisions for driving the same from and in timed relation to the carton advancing mechanism;

Fig. 9 is a top plan view of the chute or plow provisions associated with the apparatus in advance of the partition set-up device to preliminary shape the body of the carton preparatory to operation of said device on the cross carton partition;

Figs. 10A, 10B, 10C and 10D are somewhat enlarged views in transverse vertical section along lines A—A, B—B, C—C and D—D of Fig. 9 respectively, illustrating the progressive contouring of one of the chute or plow members of Fig. 9, whereby the carton body is preliminarily shaped as it longitudinally progresses through the apparatus;

Figs. 11A, 11B, 11C and 11D are, respectively, corresponding views in transverse vertical section along lines A—A, B—B, C—C and D—D of Fig. 9, illustrating the progressive contouring of the other member of the plow or chute for respective coaction with the member shown in Figs. 10A, 10B, 10C and 10D;

Fig. 12 is a view in transverse vertical section through a carton of the type operated on by the present apparatus, illustrating the same in a partially formed condition which corresponds approximately to the stage in the body forming operation which is reached at section A—A of Fig. 9; and

Figs. 13, 14 and 15 are fragmentary perspective views, further illustrating structural features of the aforesaid Cox-type carton, indicating the progressive shaping of the body and partitions thereof as the carton progresses through the various instrumentalities of the machine.

Sufficient details of structure of the aforesaid Cox-type carton for an understanding of the present invention are illustrated in Figs. 12 through 15 of the drawings and more exhaustive information regarding the same may be had by reference to the Cox patent identified above. This carton includes a body portion *a* having, in the erected condition illustrated in Fig. 15, a pair of hingedly connected bottom sections or panels *b*, from the junction of which an elongated vertical partition *c* extends longitudinally of the carton, between the front and rear walls *d*, *e*. These walls are hinged to opposite margins of bottom panels *b* along the crease lines *f*. A cover *g* is hinged along crease *h* to the rear wall and is provided with a hinged locking flap *i* which is engageable with certain cross partition hinges, to be described, to secure the cover in closing relation to the body of the carton.

A cross partition panel *l* is hinged to the front wall *d* of the carton by the longitudinally spaced creases *m*, and said panel carries a terminal glue flap *n* by which it is secured to the rear carton wall *e*. The partition panel *l* is cut to provide connected pairs of cross partition elements *o* which are integrally hinged to one another at the medial creases *p* along said panel. Said partition elements *o* of panel *l* are swingable from their original coplaner relation to one another in said panel, shown in Figs. 12, 13 and 14, to parallel upstanding relation, normal to the bottom sections *b*, about the creased hinges *q*. In so swinging, they are guided by certain upstanding tongues *r* of longitudinal partition *c*, the latter being slotted to provide said tongues.

The bottom sections are slotted at *s* to receive the lower extremities of the partition elements *o* after they have been erected, and to hold said elements in erected form.

Referring to Figs. 14 and 15, it will be noted that the hinges about which certain of the partitions elements *o* swing are so arranged that these elements swing as a set in an opposite angular direction from the direction of swing of another set. Accordingly, corresponding details of the partition elements of these two oppositely swingable sets are indicated by corresponding reference characters, primed in the case of one set.

Referring now to Figs. 1 through 11, and particularly to Figs. 1 and 2 for a general showing of the main operating instrumentalities of the apparatus and the various driving provisions therefor, the parts are mounted on a suitable tubular standard or frame 10 which supports the elongated rectangular, sheet metal bed plate 11 of the structure so that said plate extends in a forwardly and upwardly inclined plane toward the right, as viewed in Fig. 1. Bed 11 is appropriately secured to certain end and intermediate upright members of frame 10, which need not be described in detail since various other provisions to the same end may be adopted. Likewise, suitable angle iron reinforcing members may be applied to stiffen and strengthen the bed 11 in the transverse and longitudinal directions.

Said bed supports a carton feeding shuttle 12 which reciprocates longitudinally of the bed beneath an upright, open bottomed hopper 13, in which a supply of flat, knocked-down cartons S is maintained, and, in so reciprocating functions to intermittently advance these cartons longitudinally of the apparatus. The shuttle 12 is actuated by a drive device, generally designated by the reference numeral 14, which in turn derives its power from a reduction gearing 15. Said gearing is driven by a belt or chain 16 trained around a pulley or sprocket 17 on its input shaft and a like pulley or sprocket 18 on the shaft of a motor 19. This geared driving assembly is appropriate-

ly mounted on a transverse platform 20 supported by frame 10.

The carton is advanced by the shuttle 12 for a predetermined distance corresponding to the forward stroke of the latter, at the same time advancing a series of previously withdrawn cartons through a forming chute or plow device, generally designated 21, by which the bodies *a* of the cartons are progressively erected, through the positions illustrated in Figs. 12, 13 and 14. Upon leaving said plow device, the leading formed carton is delivered by thrust imparted thereto through the cartons therebehind to a partition set-up device, generally designated 22, by which its cross partitions *o* and *o'* are simultaneously swung inward to the position shown in Fig. 15 and lockingly engaged in the bottom slots *s*.

Power for the operation of the partition set-up device 22 is transmitted thereto from the reduction gearing 15 through a longitudinally extending cam shaft 23, the latter being suitably mounted in anti-friction bearings 24, 25 which depend from the machine bed 11. The rear end of this shaft has a pulley or sprocket 26 thereon which is driven from a corresponding pulley or sprocket 27 on the reduction gearing 15 by a means of a belt or chain 28. A cam 29 (see Fig. 2) is affixed to the opposite, forward end of shaft 23 and serves to actuate the various moving elements of the partition erecting device 22, in a manner which will be clear following a more detailed description of the carton feeding and forming instrumentalities of the machine. These are illustrated in Figs. 3 through 11.

With special reference to Figs. 3 through 6, the machine bed 11 is provided with a longitudinally elongated, central opening 30 of substantial width. This opening parallels the length of the bed and extends from a point substantially rearwardly of the hopper 13 to a point adjacent the front thereof but within the forward margin of said hopper. As illustrated in Fig. 3, this opening has forwardly disposed side legs or extensions 30 of substantial length. The machine bed 11 is formed to provide downwardly and inwardly projecting ways 31 along the opposite sides of opening 30 (see Fig. 5) which carry, along their upper inner margins, the longitudinally extending guide tracks 32 for the reciprocatory shuttle 12. The latter is equipped with pairs of anti-friction rollers 33 journaled on down-turned marginal flanges thereof, which rollers travel along the tracks 32 and are laterally restrained by small, upturned, inner marginal shoulders of said tracks. Accordingly, the shuttle 12 is accurately guided for longitudinal reciprocatory motion underneath the hopper 13.

Referring to Fig. 4, it will be noted that the upper surface of the shuttle 12 projects vertically somewhat above the upper surface the the bed 11. The uprights 35 of the hopper 13 are cut away at the bottom of their transverse webs 36 to permit the lowermost carton of the stack S to be advanced forwardly over bed 11 when its rear edge is engaged by a transverse hardened bar 12' on and flush with the surface of shuttle 12, said shuttle also clearing beneath the hopper uprights. Shuttle 12 is of generally U-shaped outline, as viewed in plan, the forwardly projecting legs 37 thereof being accommodated in the longitudinal extensions 30' of bed opening 30. These legs extend laterally inwardly beneath the sides of hopper 13 to vertically support the cartons in the hopper as the lowermost thereof is periodically forwarded through the apparatus.

As described above, the shuttle cross bar 12' moves on the forward stroke with the shuttle during which the lowermost carton is withdrawn from the stack and, by engaging the rear edge of a previously withdrawn carton, causes a succession of the cartons to be advanced through the body forming device 21 to the partition erecting device 22. Bar 12' and the rear portion of shuttle 12 slide beneath and support the stack of cartons in this stroke.

The aforesaid movement of the shuttle is furnished by the drive device 14 shown in Figs. 4 and 5. A vertical drive shaft 38 is appropriately journaled in a fixed bearing 39 which is carried by a U-shaped cross bracket 40 depending from the machine bed. At its lower end the shaft 38 has a bevel gear 41 secured thereon which meshes directly with the bevel gear 42 on the shaft of the reduction gearing 15. At its upper end, shaft 38 has an elongated crank 43 fixed thereon, which crank in turn is pivoted at its end to the shuttle actuating link 45. Said link is swiveled to a central, depending, bottom extension 46 of shuttle 12.

The length of shuttle drive crank 43 is such that shuttle 12 has an overall forward travel somewhat greater than the front-to-rear dimension of hopper 13. Since the carton engaging cross bar 12' of the shuttle comes to rest just behind the hopper after its retractile stroke, it follows that on its feed stroke the shuttle advances each carton out of the hopper and beneath the longitudinal hold-down plates 47 which overlie the slot extensions. Meanwhile the shuttle vertically supports the next carton. The plates 47 are affixed to bed 11 and overhang the side edges of the advancing cartons to prevent one thereof from accidentally overriding or underriding another as they are advanced through the succeeding forming devices 21 and 22.

The above provisions constitute a very simple, inexpensive, reliable and fool-proof carton feed device and drive thereof, having few parts which are likely to become out of adjustment or inoperative throughout a long life of operation. The cartons themselves are in control, to a great extent, of the feeding operation, both vertical and longitudinal.

The foremost advancing carton of the succession intermittently forwarded by the shuttle 12 enters the plow-type forming device 21, details of which are illustrated in Figs. 9 through 11D. Figs. 10A–11A, 10B–11B, 10C–11C and 10D–11D represent corresponding sectional views of the two coacting plow or chute elements 50, 51 which constitute this device, at spaced points longitudinally thereof. Elements 50, 51 are preferably made of aluminum castings appropriately bolted to the machine bed in proper, laterally spaced relation to one another. Referring to Figs. 11A, 11B, 11C and 11D, it will be noted that the lower side of element 51 is slightly recessed at 52 to accommodate the laterally outspread cover *g* of the carton as its body *a* is being progressively manipulated to generally quadrilateral outline in passing through the chute 21.

It is not deemed necessary to describe in detail the progressive shaping of the carton body by the coacting nose portions 53, 54 of chute elements 50, 51, respectively, since this general type of chute or plow forming arrangement is well known in the art. It suffices to state that, following travel through the chute, the carton has the general outline illustrated in Fig. 14, and in dotted lines in Fig. 8. It is laterally sustained

and held in position for operation by the erecting device 22 by a shaped abutment 56 which is in effect the forward extension of the chute element 50. This abutment is longitudinally coextensive with a fixed, rectangular, box-like frame 57 of the partition erecting device 22, as illustrated in Fig. 7, and its rear end is in receiving relation to the forward portion of chute 21.

Like the chute element 51, the partition erecting frame 57 is laterally recessed at 60 along its lower side to accommodate the cover of the carton. As a matter of fact, said frame may be considered as a forward extension of the chute element 51, since it coacts with the abutment 56 of chute element 50 in sustaining the carton body during the operation of its partition erecting members.

Structural features of the partition erecting device 22 are best illustrated in Figs. 3, 7 and 8. They include the transversely reciprocable actuating heads 61, 62 which may each be in the form of integral one-piece castings, said heads being respectively provided with sets of slightly angled, laterally projecting, partition engaging and erecting fingers, designated 63, 64, respectively. In the illustrated embodiment, head 61 has five fingers and head 62 has two, angled or curved in the direction opposite that of the fingers on head 61. These fingers are each provided with a relieved or recessed outer extremity, as indicated at 65 in Fig. 8, which terminates in an inner transversely extending slot 66 located medially of the upper and lower edges of the fingers. The aforesaid heads rest on the lower surface of frame 57 for support in their reciprocatory movement and have the ribbed, outwardly projecting extensions 67 which terminate in bosses 68. These bosses are longitudinally bored for the reception of a cylindrical drive and guide rod 69 (see Fig. 4), by which heads 61, 62 are coupled for transverse reciprocation as a unit, while being free to slide longitudinally on said rod during such reciprocation. The upper end of a cam actuated crank 70 is pivoted to rod 69 between the head bosses 68, whereby upon oscillation of said crank the heads 61, 62 are reciprocated as a unit, meanwhile sliding on the rod by which they are coupled for such unitary movement. A pair of collars 71 secured to rod 69 act to limit longitudinal movement of the latter with respect to crank 70.

Each of the aforesaid bosses 68 carries an upstanding pin 72 serving to journal a small cam follower roller 73 adjacent the rear of the respective partition actuating heads 61, 62; and said heads also have similar cam rollers 74 similarly journaled in spaced relation to rollers 73 inwardly of the heads, i. e., adjacent the respective partition erecting fingers 63, 64 of said heads. The cover member 57' of fixed frame 57 is provided with guide tracks or cam surfaces for these rollers, in the form of elongated, angled slots, as shown in Fig. 7. One set of these slots, designated by the reference numeral 75, coacts with the cam rollers 73, 74 which are associated with the head 61 and another set, designated 76, coacts with the corresponding rollers of head 62. The cam slots of the respective sets are parallel, but the sets diverge with respect to one another, with the result that, as heads 61, 62 are shifted inwardly as a unit, they are cam-actuated simultaneously by this simple arrangement in a longitudinally divergent manner. This produces the shifting movement of the respective sets of fingers 63, 64 in opposite longitudinal directions, attending the inward movement of the respective sets of fingers 63, 64 to engage the respective sets of carton partitions *o*, *o'*, which effects the successful swinging of the respective sets of partitions in opposite angular directions about their respective hinges *q*, *q'*. They are actuated by said fingers to the final erected position thereof, in which they are retainingly engaged in the slots *s* of the carton bottom.

The cam-actuated crank 70 referred to above is appropriately pivoted at 80 on a fixed bracket 81 depending from the machine bed 11 and has an intermediate cam follower roller 82 thereon which rides against the surface of the control cam 29 on the longitudinally extending cam shaft 23. Said roller is held against the cam by a tension spring 84 connected thereto and anchored at 85 to the machine bed. Accordingly, the erecting heads 61, 62 are driven in timed relation to the actuation of the carton feeding shuttle 12, the design of cam 29 being such that the heads 61, 62 complete an inward partition-erecting stroke and an outward return stroke during the phase of the shuttle operation in which the latter is moving on its rearward, return stroke, i. e., to the left as viewed in Fig. 4.

The above described apparatus is notable for the simplicity of its construction and the small number of moving parts. Yet it functions to maintain positive control on the cartons manipulated thereby throughout the entire feeding, body forming and partition erecting cycle. I am aware that those skilled in the art will perceive the possibility of various alterations in its structure without departing from the principles of the invention, hence desire that the invention be construed no more limitedly than is indicated by the appended claims.

I claim:

1. In a carton set-up machine, a bed along which flat, knock-down cartons are adapted to be advanced as a series in front-to-rear, edge engagement with one another, a hopper supplying said cartons gravitationally, a reciprocatory shuttle movable beneath said hopper from the rear to the front side thereof in supporting relation to cartons therein, means actuating said shuttle in a reciprocatory stroke of length approximating the rear to front dimension of said hopper, said shuttle being engageable with the rear edge of the lowermost carton therein to advance the same and the preceding series along said bed, means on opposite sides of the path of carton advance to restrain said cartons vertically against longitudinally overlapping one another, and a fixed body forming device which is elongated in the direction of carton advance and through which said series of cartons is progressively driven by said shuttle.

2. In a carton set-up machine, a bed along which flat, knock-down cartons are adapted to be advanced as a series in front-to-rear, edge engagement with one another, a hopper supplying said cartons gravitationally, a reciprocatory shuttle movable beneath said hopped from the rear to the front side thereof in supporting relation to cartons therein, means actuating said shuttle in a reciprocatory stroke of length approximating the rear to front dimension of said hopper, said shuttle being engageable with the rear edge of the lowermost carton therein to advance the same and the preceding series along said bed, means on opposite sides of the path of carton advance to restrain said cartons vertically against longitudinally overlapping one another, a fixed body

forming device which is elongated in the direction of carton advance and through which said series of cartons is progressively driven by said shuttle, and means for reciprocating said shuttle comprising a rotative drive shaft normal to and beneath said bed, a crank secured to said shaft and a link swivelled at opposite ends thereof to said crank and shuttle.

3. A set-up machine for cartons of the transverse partition type, comprising means for intermittently advancing cartons longitudinally in a partially erected condition of the bodies thereof and a partition erecting device located on one side of the path of advance of said cartons and movable transversely of said path, said device being operable to engage and swing certain sets of the transverse partitions of said cartons respectively in opposite angular directions into an erected position normal to the carton body and to said path, said device comprising a pair of movable heads each having one or more partition erecting members in fixed relation thereto, which members are engageable with partitions of said respective sets, and means to shift said heads in opposite directions simultaneously with and at an angle to the direction of movement of said device.

4. A set-up machine for cartons of the transverse partition type, comprising feed means for intermittently advancing the cartons longitudinally in a partially erected condition, and a partition erecting device located on one side of the path of advance of said cartons and operable during a dwell in the operation of said feed means to engage and swing certain sets of the transverse partitions of said cartons respectively in opposite angular directions into an erected position normal to the path of carton travel, said device comprising a pair of reciprocable heads each having one or more partition erecting members in fixed relation thereto, which members are engageable with partitions of said respective sets, fixed cam means engageable with said heads upon said reciprocation thereof to shift the same in opposite directions at an angle to the direction of their reciprocation and simultaneously with said reciprocation, means to reciprocate said heads transversely as a unit, and a common support on which said heads are mounted for independent sliding movement attending said angular shifting, said reciprocating means being operatively connected to said support.

5. A set-up machine for cartons of the transverse partition type, comprising means for intermittently advancing the cartons longitudinally in knock-down condition, a forming chute through which said cartons are advanced by said means and are shaped to partially erected condition, and a partition erecting device located on one side of the path of advance of said cartons and operable to engage and swing certain sets of the transverse partitions of said cartons respectively in opposite angular directions into an erected position normal to the path of carton travel, said device comprising a pair of reciprocable heads each having one or more partition erecting members in fixed relation thereto, which members are engageable with said respective sets of partitions, means to reciprocate said heads transversely of the path of carton advance, and cam means acting upon said heads in the reciprocation thereof to shift the same in opposite directions at an angle to the direction of their reciprocation and simultaneously with said reciprocation.

6. A partition erecting device for a carton set-up machine, adapted to swing certain sets of cross partitions of a partially formed carton respectively in opposite angular directions from a generally coplanar position into upstanding relation to the carton bottom, said device comprising a frame on one side of said carton, a pair of partition erecting heads guided in said frame for transverse movement as a unit toward and away from said carton, each of said heads having one or more partition swinging members fixed thereon, means to transversely reciprocate said heads, cam follower elements mounted on said respective heads, and oppositely inclined cam surfaces on said frame co-acting with said respective cam follower elements to shift said heads independently of one another at an angle to the direction of transverse movement thereof and simultaneously with said movement.

7. A partition erecting device for a carton set-up machine, adapted to swing certain sets of cross partitions of a partially formed carton respectively in opposite angular directions from a generally coplanar position into upstanding relation to the carton bottom, said device comprising an abutment sustainingly engageable with one side of said carton bottom, a frame on the opposite side of said carton, a pair of partition erecting heads guided in said frame for transverse movement as a unit toward and away from said carton, each of said heads having one or more partition swinging members fixed thereon, means to transversely reciprocate said heads, cam follower elements mounted on said respective heads, and opposite inclined cam surfaces on said frame co-acting with said respective cam follower elements to shift said heads independently of one another at an angle to the direction of transverse movement thereof and simultaneously with said movement.

8. In a carton set-up machine, a support along which flat, knock-down cartons are serially advanced in front-to-rear edge engagement with one another, a supply hopper delivering said cartons sequentially toward said support, a reciprocatory shuttle movable on the delivery side of said hopper from the rear to the front thereof in sliding relation to cartons therein, means actuating said shuttle in a reciprocatory stroke of length approximating the rear to front dimension of said hopper, said shuttle being engageable with the rear edge of the endmost carton being delivered by said hopper to separate the same from subsequent cartons therein and to advance the same and a previously delivered series along said support, means adjacent the path of carton advance to restrain said cartons against longitudinal overlapping, and a fixed body forming device elongated in the direction of carton advance, through which said series of cartons is progressively driven by said shuttle while in engagement with said endmost carton.

9. A set-up machine for cartons having longitudinally extending side walls and cross partitions disposed normal to said walls in the completely erected condition of the carton, comprising a partition erecting device operable upon a partially erected carton in a direction transverse of said side walls to engage and swing certain sets of said cross partitions in opposite directions to their erected position normal to said walls, said device comprising a pair of movable heads each having one or more partition erecting members in fixed relation thereto, which members are engageable with partitions of said

respective sets, and means to shift said heads in opposite longitudinal directions simultaneously with said transverse operation.

10. A set-up machine for cartons having longitudinally extending side walls and cross partitions disposal normal to said walls in the completely erected condition of the carton, comprising a partition erecting device operable upon a partially erected carton in a direction transverse of said side walls to engage and swing certain sets of said cross partitions in opposite directions to their erected position normal to said walls, said device comprising a pair of movable heads each having one or more partition erecting members in fixed relation thereto, which members are engageable with partitions of said respective sets, and fixed cam means engaged by said members during transverse operation of said device to shift said heads in opposite longitudinal direction simultaneously with said transverse operation of said device.

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