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Ganz

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[54] **METHOD AND APPARATUS FOR AUTOMATICALLY CORNER-BREAKING THE SIDE FLANGE EDGES OF PAPERBOARD BLANKS**

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[52] **U.S. Cl.** ..... **93/49 M,** 53/48, 93/49 R, 93/84 R, 270/67

[51] **Int. Cl.** **B31b 1/52,** B31b 1/56

[58] **Field of Search** ..... 93/1 R, 1 G, 35 R, 93/39 R, 49 R, 49 M, 52, 62, 84 R; 53/48, 196; 270/62, 67, 80, 81, 83, 84

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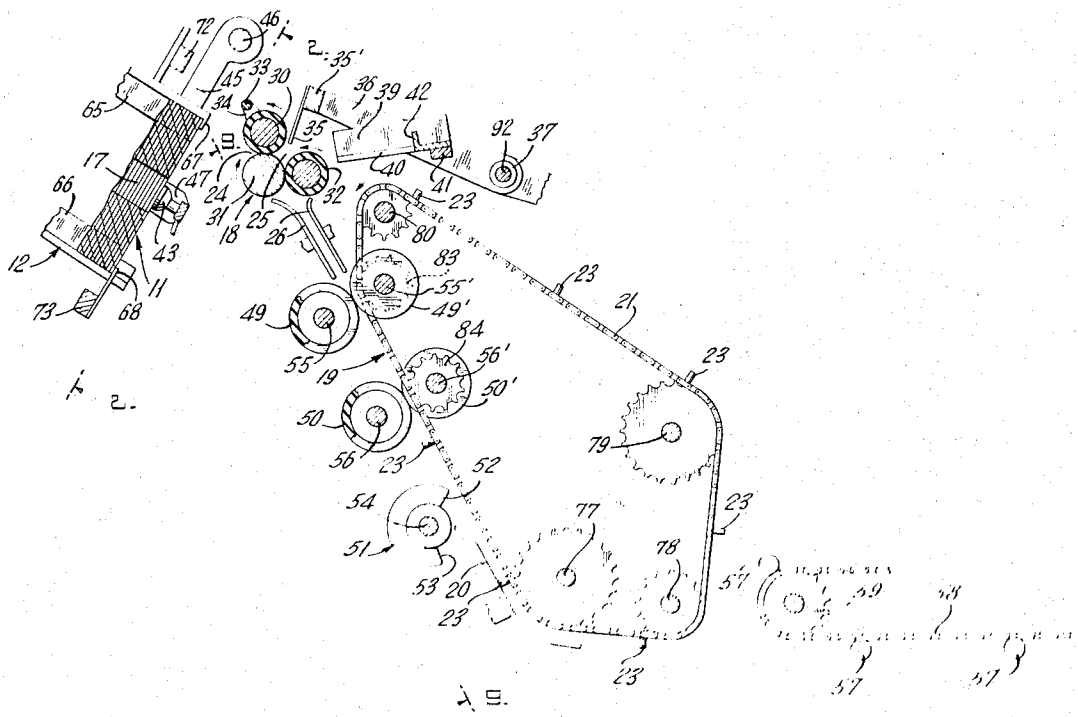
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[57] **ABSTRACT**

The invention contemplates apparatus and a method for automatically corner-breaking the side-flange edge folds of a paperboard blank having a central-panel area contiguous to and integral with longitudinally opposed side-flange areas. First pinch-roll means accepts flat stock, pinches the same to corner-break at a first desired alignment, and passes the entire blank to arresting and positioning means on the other side of the first pinch-roll means. When thus arrested, the blank is positioned adjacent second pinch-roll means, which is caused to accept and pinch the blank to corner-break at a second desired alignment. The blank passes through the first and second pinch-roll means in a continuous path of motion, interrupted only for displacement reversal when positioned for passage through the second pinch-roll means. In the specific form shown, the first and second pinch-roll means collectively comprises three rollers, wherein the central roller coacts with one of the other rollers to define the first pinch-roll means, and wherein the central roller coacts with the remaining roller to define the second pinch-roll means.

18 Claims, 14 Drawing Figures



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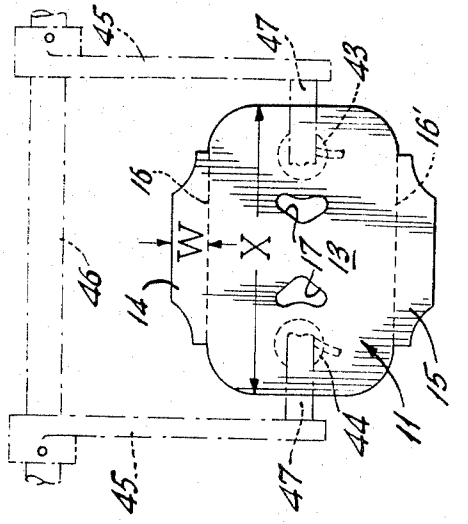


FIG. 2.

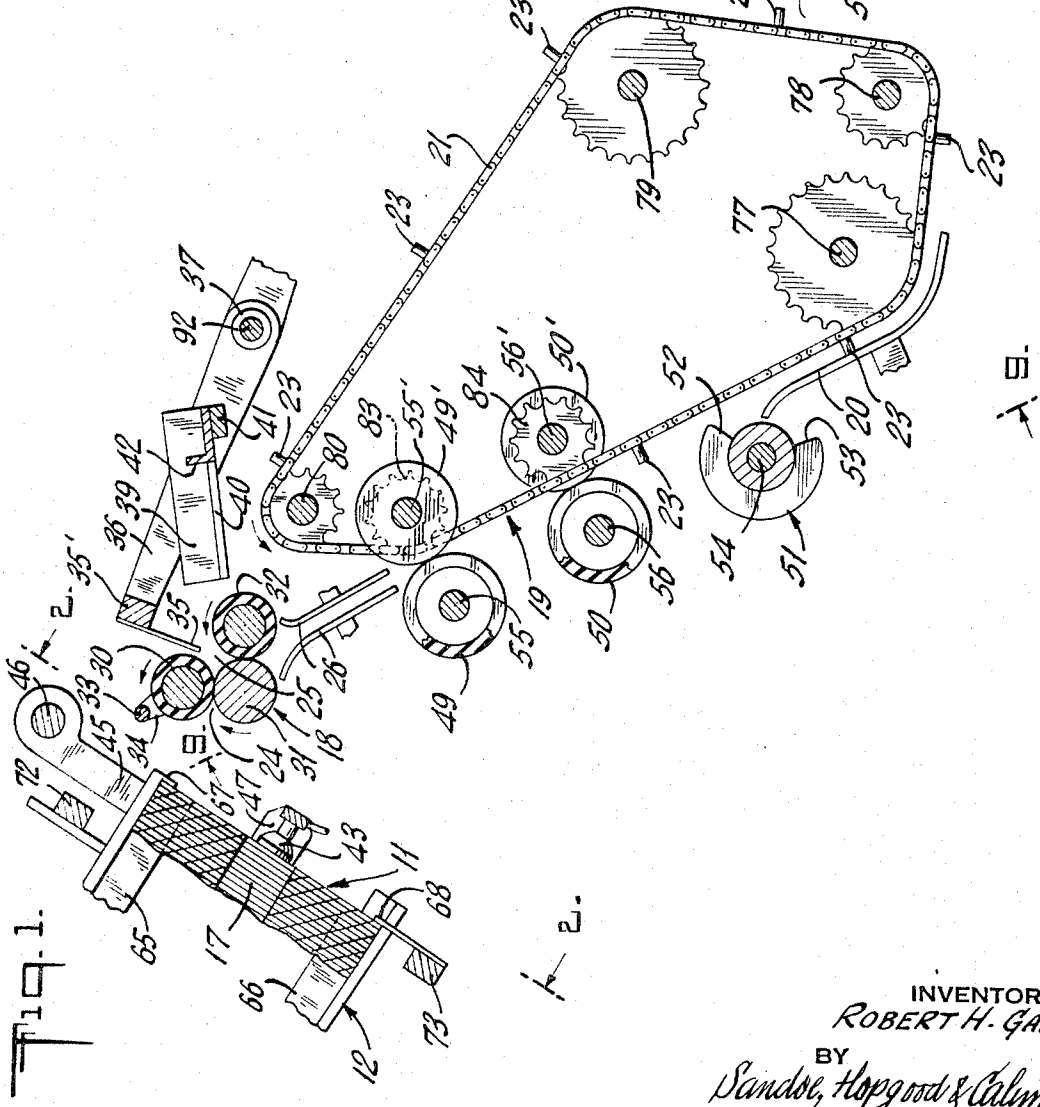


FIG. 1.

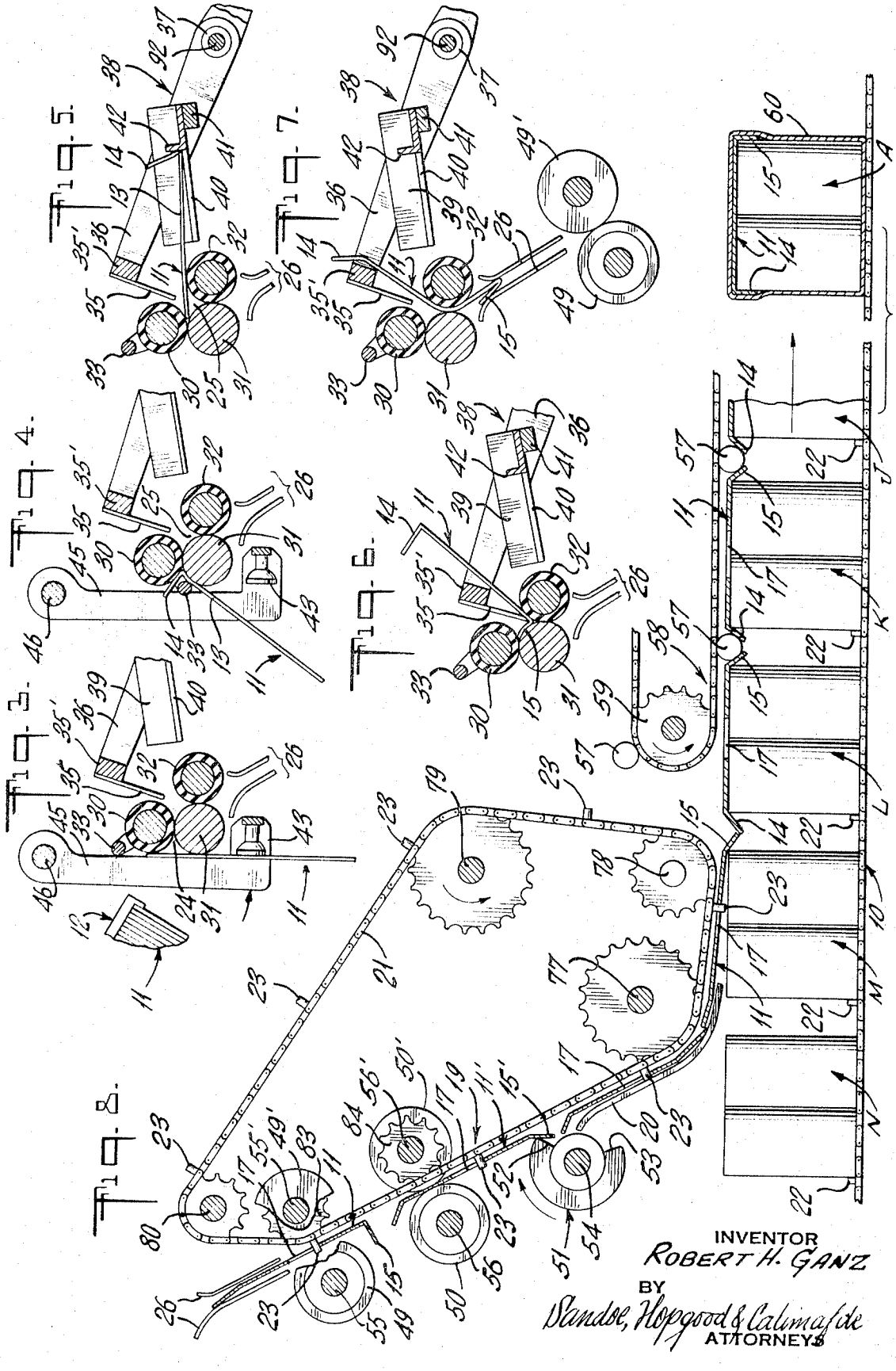
FIG. 3.

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PATENTED JUL 17 1973

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SHEET 2 OF 4



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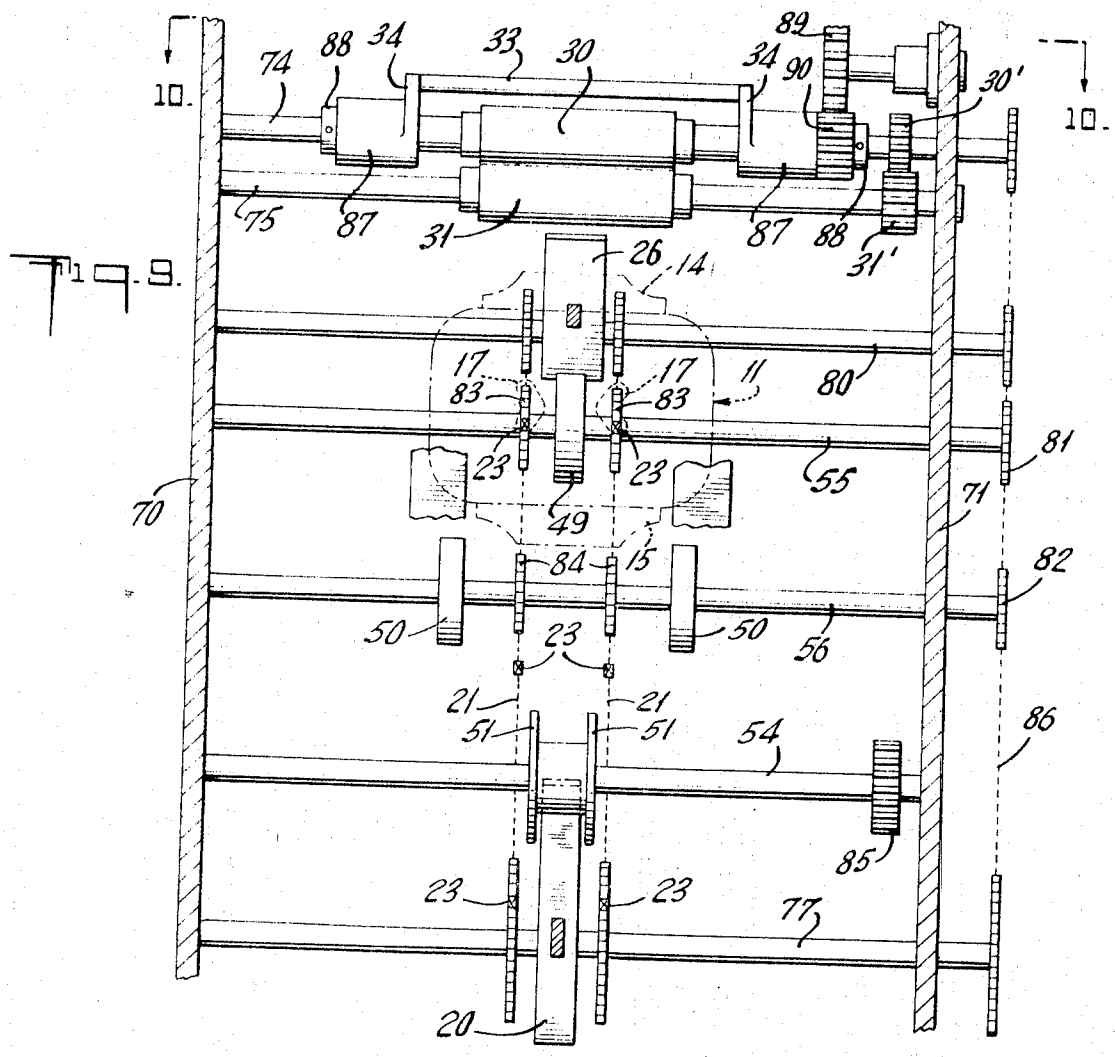


FIG. 9.

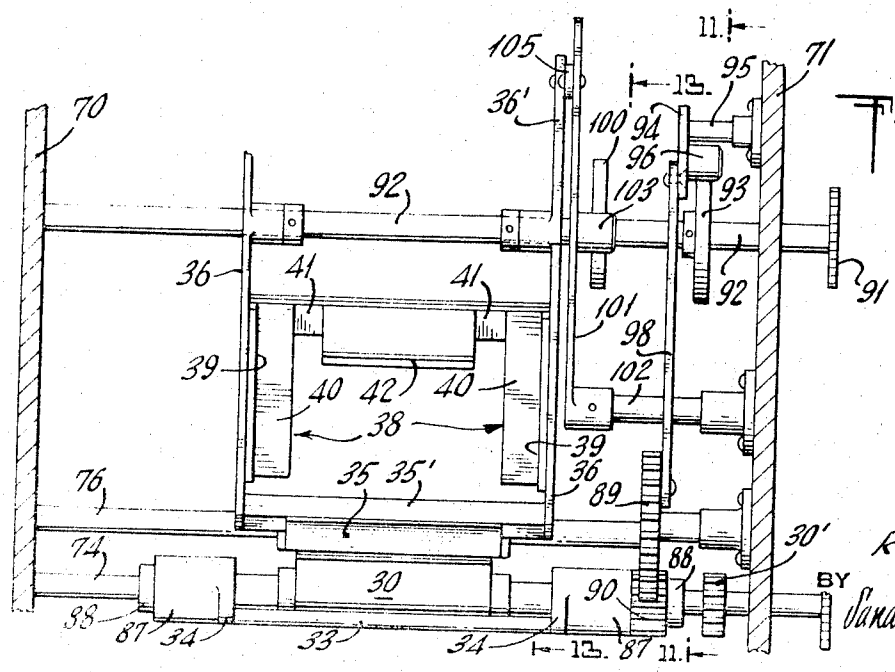


FIG. 10.

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Fig. 11.

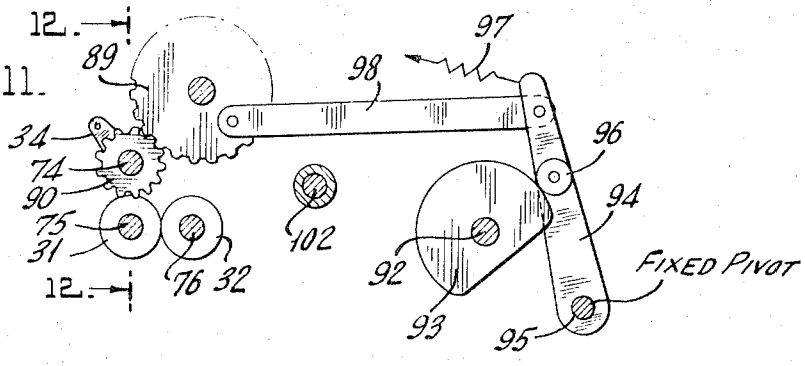


Fig. 12.

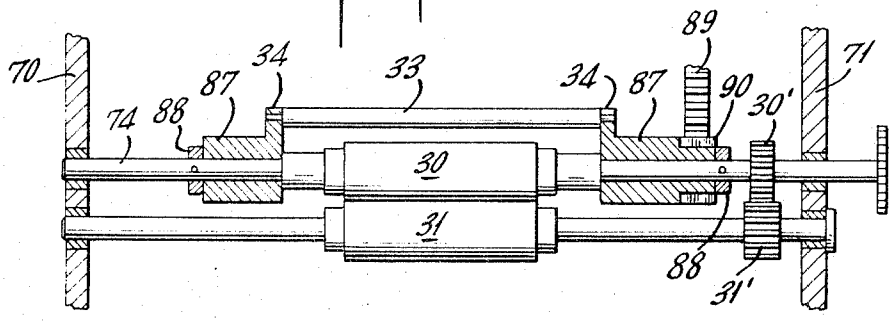


Fig. 13.

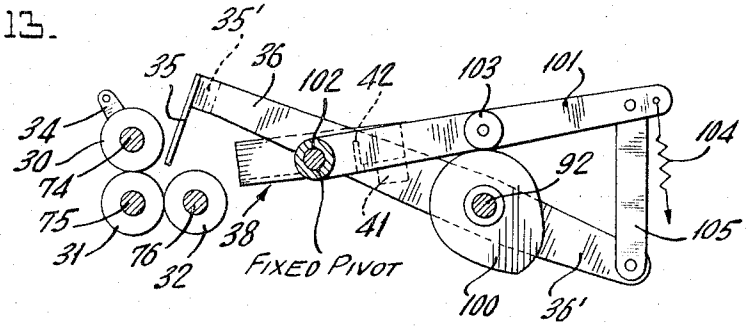
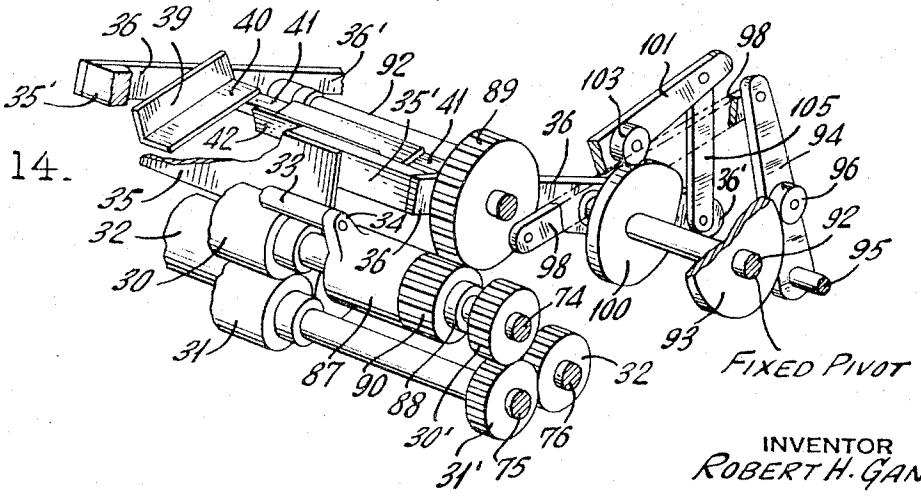


Fig. 14.



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METHOD AND APPARATUS FOR AUTOMATICALLY CORNER-BREAKING THE SIDE FLANGE EDGES OF PAPERBOARD BLANKS

This invention relates to packaging machinery and methods and has particular application to such machines and methods as are concerned with plastic shrink-wrapping of clusters of articles, as for example, two-by-three clusters of like cylindrical containers. Illustrative machines and methods of the character indicated are disclosed in great detail in my copending application Ser. No. 47,996, filed June 22, 1970, and now U.S. Pat. No. 3,660,961. Reference is made to said application for an understanding of the overall packaging operation.

In said application, mention is made, for each cluster, of the optional inclusion of a flanged paperboard top or panel extending over the tops of containers in the cluster, with the flanges bent around opposed lateral top corner edges of the cluster and extending a short distance downward. When the surrounding shrinkable-plastic sheet envelops the cluster and its paperboard panel top, shrink action clamps the paperboard flanges against adjacent upstanding opposed sides of the cluster. The paperboard panel serves the functions of reinforcing and stabilizing the package, while providing an extensive area for carrying the manufacturer's identification, dress, and message.

The present invention is particularly concerned with the means and method by which paperboard panels of the character indicated are automatically conditioned, from flat-blank status, into corner-broken flange-defining status, whereby panels are readily handled in a production shrink-packaging operation.

It is, therefore, an object of the invention to provide an apparatus and method whereby flat paperboard panel blanks may be automatically corner-broken, fold-conditioned and fed into a continuously operative shrink-wrap machine, for inclusion in the wrapped package.

Another object is to achieve the above object without displacing or modifying any existing part of the shrink-wrapping part of the machine.

A further object is to achieve the above objects without interrupting or retarding the smooth and continuous high-speed operation of the shrink-wrapping machine.

It is also an object to provide apparatus meeting the above objects and accepting flat blank stock in quantity close to the region of plastic-sheet feeding into a machine of the character indicated.

Other objects and various further features of novelty and invention will be pointed out or will occur to those skilled in the art from a reading of the following specification, in conjunction with the accompanying drawings. In said drawings:

FIG. 1 is a simplified view in side elevation of operative parts of the invention, certain portions being broken-away and in vertical section;

FIG. 2 is a view taken at 2—2 in FIG. 1, to show a work-piece, and transfer and positioning means for the same;

FIGS. 3 through 7 are like fragmentary simplified views to illustrate, in a succession of steps, the operation of the invention;

FIG. 8 is a fragmentary view, as in FIG. 1, to illustrate a final step of the invention, and its relation to a part of a cluster-wrapping machine;

FIG. 9 is a view from 9—9 in FIG. 1, being a section through side frames which are omitted from FIG. 1;

FIG. 10 is a view from 10—10 in FIG. 9;

FIG. 11 is a simplified fragmentary view of operating parts, taken at 11—11 in FIG. 10;

FIG. 12 is a view along the line 12—12 of FIG. 11, certain parts being shown in full elevation and others in section;

FIG. 13 is a view similar to FIG. 11, but showing parts as taken at the stepped alignment 13—13 of FIG. 10; and

FIG. 14 is a simplified perspective view, partly broken away, to show the relation of operative parts of FIGS. 11 to 13.

Referring to FIGS. 1, 2 and 8 of the drawings, the invention is shown as an attachment to a shrink-wrap machine of the character shown and described in said application, and here only briefly alluded to. The conveyor system of such machine will be understood to include an incoming stretch 10 (FIG. 8), comprising a horizontal span of links continuously driven by sprockets (not shown) but synchronized with shrink-wrap functions and with paperboard-handling functions of the invention. In the sense of FIG. 8, conveyor motion is from left to right, and conveyor 10 is shown for that portion of its length which serves like clusters J-K-L-M-N of containers to be packaged, the ultimately wrapped package A being shown to the right of the conveyor break, in FIG. 8; clusters not shown at the break between clusters A and J will be understood to be undergoing shrink-wrap operations described in said patent application. As in said application, each cluster may comprise a "2 × 3" six-pack of cylindrical beverage containers; for the side elevation shown, only the near two containers of each such cluster are visible, the length dimension of each cluster being transverse to the longitudinal direction of conveyor displacement. To avoid confusion, the word "longitudinal" herein refers only to the direction of the conveyor 10, i.e., to the flow direction of the conveyor, of the containers it carries, and of paperboard blanks which are continuously advanced for assembly to conveyed clusters.

The invention is concerned with rapid corner-breaking and other automatic handling of paperboard blanks 11, successively taken from the lower end of a supply or magazine 12 (FIG. 1) and having a flat planform (FIG. 2) when stacked in and picked-off from the magazine 12. The blank 11 comprises a central-panel area 13 contiguous to and integral with longitudinally opposed side-flange areas 14–15. Blank 11 is preferably scored or otherwise locally weakened along desired ultimate parallel fold alignments 16—16'; spaced central openings 17 provide reinforcement for finger access in inner spaces between containers of the six-pack, as will be understood.

After pick-off from the magazine 12, each blank 11 is processed by pinch-roll means, designated generally 18, to "corner-break" the paperboard at alignments 16—16'. The blank is then fed by auxiliary conveyor means 19, including suitable guide means 20, to discharge almost tangent to the top of the next-to-be-covered cluster, which, for the instant depicted in FIG. 8, is the cluster M. Synchronized drive to the endless chain means 21 of conveyor 19 and to the conveyor 10,

in the circumstance of conveyor-lug engagement to container clusters (at 22) and of conveyor-lug engagement to blanks (at 23), assures perfect overlay of the blanks on the tops of moving clusters. As shown, the feed lugs 23 of the auxiliary conveyor means 19 are provided as laterally spaced pairs, for simultaneous engagement with the respective finger openings 17 of each blank 11.

In accordance with the invention, the pinch-roll means 18 establishes first and second pinching engagements, between continuously driven but oppositely rotated rolls which establish a first entering pinch region 24 and a second entering pinch region 25, for ultimate discharge into suitable guide means 26 for pick-up and displacement by the auxiliary conveyor means 19.

The indicated pinch-roll action may be achieved by two pairs of pinch rolls, suitably positioned and driven to achieve the desired function; but, in the form shown, I indicate my preference for employment of a cluster of three adjacent rolls 30–31–32, the first and last of which are shown with an outer friction layer or surface, for no-slip pinch and feed action on the work-piece or blank 11. Preferably also, all three rolls 30–31–32 are of substantially the same radius, which may be in the order of magnitude of flange width W (FIG. 2), with the axes of the first pair 30–31 in a generally vertical or upstanding plane, and with the axes of the second roll pair 31–32 in a transverse or generally horizontal plane. All three rolls 30–31–32 are continuously driven in opposite directions, as shown by arrows in FIG. 1 and as suggested by meshing gears 30'–31'–32' in other figures; such drive is synchronized (by means not shown) with drive to the conveyors 19–10.

Also synchronized with the indicated continuous drive system are two reciprocating blank-engaging elements associated with the pinch mechanism 18. A first of these is a rod 33, spanning the overall length dimension X of blank 11, and positioned by like crank arms 34 at its opposite ends; arms 34 are confined (by means to be later described) to reciprocating rotary gyration about the axis of the first roll 30. Such reciprocation is intermittent, from a normal raised, at-rest position (shown in FIG. 1), to a transiently lowered, board-urging position close to the pinch region 24 (shown in FIG. 4). The second blank-engaging means is an intermittently reciprocated elongated plate 35, also substantially spanning the blank dimension X, and positioned by like arms 36 at its opposite ends; arms 36 are confined by a frame-based pivot axis 37 and are driven in reciprocation (by means to be described in connection with FIGS. 13 and 14), between a normally raised, at-rest position (shown in FIG. 1), to a transiently lowered, board-urging position close to the pinch region 25 (shown in FIG. 6).

A cradle is also carried by the arms 36 and forms part of blank-positioning means after performing a first pinch and prior to performing the second pinch on each blank 11. As shown, the cradle comprises spaced parallel angle members 38, defining upstanding lateral blank-guiding or locating surfaces 39 and slightly inclined bottom-supporting flange surfaces 40, for the respective short ends of the blank 11. A tie piece 41 spans the arms 36 and carries a stop or angle member 42, poised to arrest a blank 11 as it is discharged from rolls 30–31.

The corner-breaking action of the described pinch mechanism 18 will be understood from discussion of a cycle of handling one blank 11, in connection with FIGS. 3 to 7. The blank 11 is picked-off from the lower open end of magazine 12, as by a swinging, intermittently reciprocated structure which carries vacuum-operated pick-off elements 43–44; the swing structure comprises two parallel spaced arms 45, pinned to an intermittently reciprocated shaft 46, and carrying elements 43–44 at laterally offsetting brackets 47, at the ends of arms 45. As seen in FIG. 2, the vacuum pick-off engagements with blank 11 are laterally offset from the finger openings 17. Vacuum connection to pick-offs 43–44 will be understood to be synchronized with the intermittent reciprocation of arms 45, such that pick-off engagement with a next blank 11 occurs for the left position shown in FIG. 1, and such that such engagement is maintained throughout swinging blank-positioning displacement into adjacency with the first two pinch rolls 30–31, as shown in FIG. 3; it is at this latter position that vacuum connection is interrupted to release the hold on the blank 11 at 43–44. It will be noted that for movement to this position, the blank 11 will have cleared rod 33, which is still in its raised position, but which is immediately reciprocated down to its lower position (FIG. 4) and back (FIG. 5); also, it will be noted that at its lowered or second position, the blank-positioning means 43–44–45 will have placed the desired fold alignment 16 substantially in a generally horizontal plane that is substantially tangent to adjacent pinch regions of rolls 30–31. In its descent to the FIG. 4 position, rod 33 intercepts blank 11 substantially at the desired fold alignment 16, and drives the same into the pinch region 24, where, by friction engagement with the pinch rolls, the blank is not only pinched at 16 but is rapidly drawn through the rolls 30–31, to the point of arrest by stop 42 (FIG. 5).

Stop 42 is so offset from the pinch region 25 as to locate the second desired fold alignment 16' in substantially vertical register with the second pinch region 25 (i.e., substantially in the plane of tangency to adjacent regions of the second roll pair 31–32). And it will be noted that the second blank-engaging means 35 is then poised for descent to contact, depress and feed blank 11 (local to the desired alignment 16') into frictional pick-up by rolls 31–32 in the pinch region 25 (FIG. 6). Rolls 31–32 swiftly convey blank 11, in a reversed direction for downward discharge, and in the course of such movement, the severely pinched first flange 14 (FIG. 6) is caused to strike and drag past the tie bar 35' by which plate 35 is connected to arms 36; such drag moderates the fold of flange 14 to an obtuse, trailing angle, with respect to the central-panel area 13, assuring that the corner-broken edge at 16 will be no cause for fouling the mechanism.

Upon exit from the pinch mechanism 18, the blank is intercepted and guided by the spaced funneling rails or shoes 26 to spaced pairs of friction feed rolls 49—49', 50—50', forming part of the auxiliary conveyor 19. Rolls 49—49' are driven in synchronism with the endless chain means of conveyor 19 and they stabilize blank 11 for synchronized entry of a feed lug 23. While the blank is thus conveyed, the roll pair 50—50' assumes a further stabilizing function, during operation of a "kicker" 51, to extend the flange 15, from a severe fold as shown in FIG. 8 at 15, for the blank 11 stabilized by rolls 49—49', to the much more obtuse angle shown at 15' for the immediately preceding blank 11'. The kicker 51 is shown as a roll or plate, having a large

opening or notch in its periphery, said notch extending from a kicker leading edge **52** to a trailing edge **53**. The kicker **51** is driven at a speed such that the kicking edge **52** engages the folded flange **15** (**15'**) at substantially greater speed than that of blank movement by conveyor **19**. For example, for a maximum kicker diameter approximating that of feed roll **50**, the drive speed of kicker shaft **54** is conveniently twice that of the drive shafts **55–56** for the stabilizing rolls **49'—50'**. Having "kicked" flanges **15** of successive blanks just prior to engagement with guide means **20**, there is no danger of fouling this leading flange (**15**), and properly coordinated, longitudinally centered application to passing clusters is assured.

The flanges **14–15** of blanks applied to successive clusters will be naturally and gently sloped down from the leading and trailing corners of each cluster, as suggested in FIG. **8**, for adjacent flanges **15–14** of the respective blanks applied to clusters M–L. This relation is convenient for immediate locating control of the tops of all clusters, as by entry of suitably spaced stabilizing bars **57** carried by an endless overhead conveyor system **58**; conveyor **58** may be driven by means **59** in synchronism with drive to conveyor **10**. It will be understood that conveyor **58** (and its bars **57**) extends sufficiently to assure control of cluster tops and their registering folded blanks **11**, until introduction of plastic sheet for package-wrapping, all as described in said application. After wrapping, including oven-shrinking, the enveloping plastic sheet **60** is drawn tightly over the containers and flanges **14–15** and has the appearance of cluster A in FIG. **8**.

Having thus described the general arrangement and operation of my method and apparatus, I shall give further specific detail for the particular preferred form shown.

The magazine **12** comprises a rigid system of upper and lower elongated corner guide members **65–66**, within which the stack of blanks **11** is securely nested and guided, for gravity feed, to present the lowermost blank **11** for ready pick-off. Small retaining lugs or lips **67–68** at the dispensing end hold the stack in place and yet do not interfere with vacuum pick-off of the end blank **1**.

The entire blank-pinching and feeding mechanism is contained between upstanding side frame members **70–71**, which are shown only in FIGS. **9**, **10** and **12**. Magazine **12** is carried by bars **72–73** spanning these frame members, and the pick-off shaft **46** is journaled in both of them. Other operative shafts of the system are also journaled in these frame members, including the exit-feed stabilizing-roll shafts **55–56** already identified, as well as shafts **74–75–76** for the pinch rolls **30–31–32**, the kicker shaft **54**, and the various further shafts **77–78–79–80** relied upon to establish the path of the endless chain means of conveyor **19**. In FIG. **9**, the endless chain means **21** is seen to comprise two laterally spaced like chain systems, spaced according to the finger-openings **17**, for entry of transport lugs **23**. It will be noted from FIGS. **1**, **8** and **9** that drive sprockets **81–82** and their conveyor-chain counterparts **83–84** may be the means whereby drive is imparted to the stabilizing rollers **49—49'–50—50'**; preferably of larger diameter than sprockets **83–84**, so that friction-feed of blanks **11** is slightly and transiently in excess of chain-lug feed at **23**, thus avoiding any real need to drag the blank **11** against a lug. This feature will be seen to assure that the product will have an unmarred look, and yet if something should happen to spoil the effectiveness of such friction feed, the lugs **23** will always be properly phased and placed to assure against a jam of blanks **11** in the mechanism.

In the case of shaft **54** in FIG. **9**, pinion **85** will be understood to suggest drive synchronized with the other drives but at the higher speed already indicated. The interconnection of all other drives is suggested at **86** on one outer side of the described framing **70–71**, as for example to the sprockets **81–82** already identified.

FIG. **9** also illustrates the mounting of the intermittently reciprocated arms **34** for bar **33**. This is seen to comprise an enlarged hub or boss **87** for each arm and rotatable on the pinch-roll drive shaft **74**. Collars **88** stabilize the central position of bar **33**, and a gear train **89–90** is the means whereby intermittent reciprocation is transmitted to bar **33**. This intermittent motion is generated by mechanism which best appears in FIGS. **10**, **11** and **14**. Basically, one of the continuous-drive pick-off sprockets **91** and its shaft **92** are used for cam-drive purposes; and the shaft **92** performs the further function of establishing fixed-axis free-pivot support of arms **36** of the second blank-engaging means, for which the fixed-axis pivot hub has already been identified at **37** in FIG. **1**. A first plate cam **93** driven by shaft **92** imparts rocking motion to an arm **94**, having one end fixedly pivoted at **95** to frame member **71**, and having a follower roll **96** tracking cam **93**; frame-based spring means **97** normally urges such follower-tracking. The reciprocating motion of the end of arm **94** is transmitted by a link **98** to the gear **89**, and a substantially 2:1 gear step-up ratio at **89–90** assures rapid descent of arm **34** (with rod **33**) when the new blank **11** is to be fed at its score **16** to the first pinch zone **24**.

Intermittent rotary reciprocation for the second blank-engaging means **35** is derived from a second plate cam **100** fastened to the same cam shaft **92**, and the entire mechanism is best seen in FIGS. **10**, **13** and **14**. Basically, a cam pick-off pivot arm **101** is fixedly pivoted at **102** to the frame member **71**. This arm **101** is equipped with a follower roll **103**, urged by a frame-based spring **104** to constantly track the cam profile. A link **105** connects the free end of arm **101** to a correspondingly offset back end **36'** of the arm system **36**. Thus, as cam **100** rises from the 180° dwell on which follower **103** is shown in FIG. **13**, link **105** is drawn upward, to rock arm **36** downwardly, for transient blank-engagement and depression at the alignment **16'**.

It will be seen that I have described a basically simple system for efficient corner-breakage and well-synchronized feeding and control of a paperboard blank of the character indicated, meeting all stated objects. Of particular importance is the fact that by adapting the paperboard handling mechanism of this invention to the shrink-wrapping mechanism of said application, there is not the slightest limitation upon or impairment of the speed or efficiency of shrink wrapping.

What is claimed is:

1. Mechanism for automatically corner-breaking the side-flange edges of a paperboard blank having a central-panel area contiguous to and integral with longitudinally opposed side-flange areas, comprising blank-supply means presenting successive blanks at a pick-off location, first pinch-roll means establishing a first pinching and longitudinally feeding plane substantially tangent to adjacent oppositely driven surfaces of a first

pair of rolls, first blank-positioning means for orienting a blank adjacent said roll surfaces and with a first desired corner-break alignment substantially in said tangent plane, said first blank-positioning means including reciprocating means having a first position of pick-off engagement with the presented end blank at said pick-off location, said reciprocating means being movable to a second position in which the picked-off blank is oriented adjacent the roll surfaces of said first pinch-roll means and with the first desired corner-break alignment substantially in said first-mentioned tangent plane, blank-engaging means local to substantially said first alignment when thus positioned and movable to advance the blank into frictional engagement with said first roll means, means continuously driving said first roll means in the direction to pinch and feed the blank along substantially the tangent plane to the other side of said first roll means, second pinch-roll means establishing a second pinching and longitudinally feeding plane substantially tangent to adjacent oppositely driven surfaces of a second pair of rolls, second blank-positioning means arresting the blank and orienting the same adjacent roll surfaces of said second roll means and with the second desired corner-break alignment substantially in said second-mentioned tangent plane, blank-engaging means local to substantially said second alignment when thus positioned and movable to advance the blank into frictional engagement with said second roll means, and means continuously driving said second roll means in the direction to pinch and feed the blank along substantially the second tangent plane to the other side of said second roll means.

2. Mechanism according to claim 1, in which said tangent planes are in substantially transverse relation, the second-mentioned transverse plane intersecting the first-mentioned transverse plane on said other side of said first roll means.

3. Mechanism according to claim 1, in which said first and second pinch-roll means collectively comprise three rolls, the first and second of said three defining said first pinch-roll means, and the second and third of said three defining said second pinch-roll means.

4. Mechanism according to claim 3, in which said rolls are all cylindrical and in which the plane of the axes of the first two of said three rolls is substantially transverse to the plane of the axes of the second and third of said three rolls.

5. Mechanism according to claim 1, in which said reciprocating means includes a vacuum pick-off element, and means synchronized with the movement of said reciprocating means and controlling vacuum-operation of said pick-off element for blank-holding throughout movement from the first to second positions of said reciprocating means.

6. Mechanism according to claim 5, in which said last-defined means includes means synchronized with operation of said first-mentioned blank-engaging means for determining blank-release by said pick-off element as said first-mentioned blank-engaging means begins to advance the blank into frictional engagement with said first roll means.

7. Mechanism according to claim 5, including means actuating said first-mentioned blank-engaging means in synchronized interlace with movement of said reciprocating means, said first-mentioned blank-engaging means being actuated in the blank-engaging and blank-displacing direction when said reciprocating means attains substantially the second position thereof.

8. Mechanism according to claim 7, including means actuating said second-mentioned blank-engaging means in synchronized interlace with movement of said first-mentioned blank-engaging means, said second-mentioned blank-engaging means being actuated in the blank-engaging and blank-displacing direction when the blank is being positioned by said second blank-positioning means.

9. Mechanism according to claim 2, in which said second blank-positioning means includes a stop operative to retain a blank passed through said first roll means.

10. Mechanism according to claim 4, in which the first-mentioned tangent plane is generally horizontal and said second pinch-roll means is beneath said first-mentioned tangent plane, with the third of said three rolls substantially tangent to said first-mentioned tangent plane, said second blank-positioning means including a stop operative to arrest blank movement after it has cleared the pinch region of said first roll means and with the blank supported at least in part by said third roll.

11. Mechanism according to claim 1, in which a single drive provides both said drive means.

12. Mechanism according to claim 1, in which all rolls of said first and second pinch-roll means are cylindrical and of substantially the same diameter.

13. Mechanism according to claim 12, in which all rolls of said first and second pinch-roll means have external surfaces of friction material.

14. Mechanism according to claim 1, in which said blank-supply means comprises a magazine for retaining a plurality of flat blanks, the pick-off location being at one end of said magazine.

15. Mechanism for automatically corner-breaking the side-flange edges of a paperboard blank having a central-panel area contiguous to and integral with longitudinally opposed side-flange areas, comprising first pinch-roll means establishing a first pinching and longitudinally feeding plane substantially tangent to adjacent oppositely driven surfaces of a first pair of rolls, first blank-positioning means for orienting a blank adjacent said roll surfaces and with a first desired corner-break alignment substantially in said tangent plane, blank-engaging means local to substantially said first alignment when thus positioned and movable to advance the blank into frictional engagement with said first roll means, means continuously driving said first roll means in the direction to pinch and feed the blank along substantially the tangent plane to the other side of said first roll means, second pinch-roll means establishing a second pinching and longitudinally feeding plane substantially tangent to adjacent oppositely driven surfaces of a second pair of rolls, second blank-positioning means arresting the blank and orienting the same adjacent roll surface of said second roll means and with the second desired corner-break alignment substantially in said second-mentioned tangent plane, blank-engaging means local to substantially said second alignment when thus positioned and movable to advance the blank into frictional engagement with said second rolls means, means continuously driving said second roll means in the direction to pinch and feed the blank along substantially the second tangent plane to the other side of said second roll means, conveyor

means in synchronism with said drive means and engaging and advancing successive blanks discharged from said second roll means, and flange-kicker means on the flange-folded side of said conveyor means and synchronized with blank-conveying movement to engage flanges bent by said second roll means and kicking them in the unbending direction.

16. The method of automatically corner-breaking the side-flange edges of a paperboard blank having a central-panel area contiguous to and integral with longitudinally opposed side-flange areas, which comprises selecting three pinch rolls of radius approximating the longitudinal extent of the side-flange areas, orienting said rolls in side-by-side adjacency on parallel axes such that the orientation plane of axes for the first two rolls is substantially transverse to the orientation plane of axes for the second and third rolls, continuously rotating all said rolls with adjacent rolls rotating in opposite directions, positioning an unbroken blank substantially parallel to the first plane and adjacent the first two rolls with the desired corner-break alignment substantially in the plane of tangency to adjacent pinch regions of the first two rolls, said first two rolls being driven in the directions to pinch and draw the blank between said first two rolls, locally urging said blank in the region of said corner-break alignment into frictional engagement with said first two rolls, whereby a first side-flange area is pinched and folded back against the central-panel area of the blank as the blank is fed between said first two rolls, arresting said blank after longitudinal feed thereof by said first two rolls and at a location positioning said blank adjacent the second and third rolls with the second desired corner-break alignment substantially in the plane of tangency to adjacent pinch regions of the second and third rolls, locally urging said blank in the region of said second corner-break alignment into frictional engagement with the second and third of said rolls, whereby the second side-flange area is pinched and folded back against the central-panel area of the blank as the blank is fed between said second and third rolls, providing a supply of blanks available for pick-off of successive blanks from an end of the supply, and successively picking-off and transferring successive blanks from said end and into the position adjacent the first two rolls.

17. The method of claim **16,** including the preliminary step of scoring the blank on one side and along both the desired corner-break alignments.

18. The method of claim **16,** in which the orientation of roll axes is horizontal, with the third roll beneath and substantially tangent to the plane of tangency to adjacent pinch regions of the first two rolls, whereby blank discharge is downward upon passage by the second and third rolls.

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