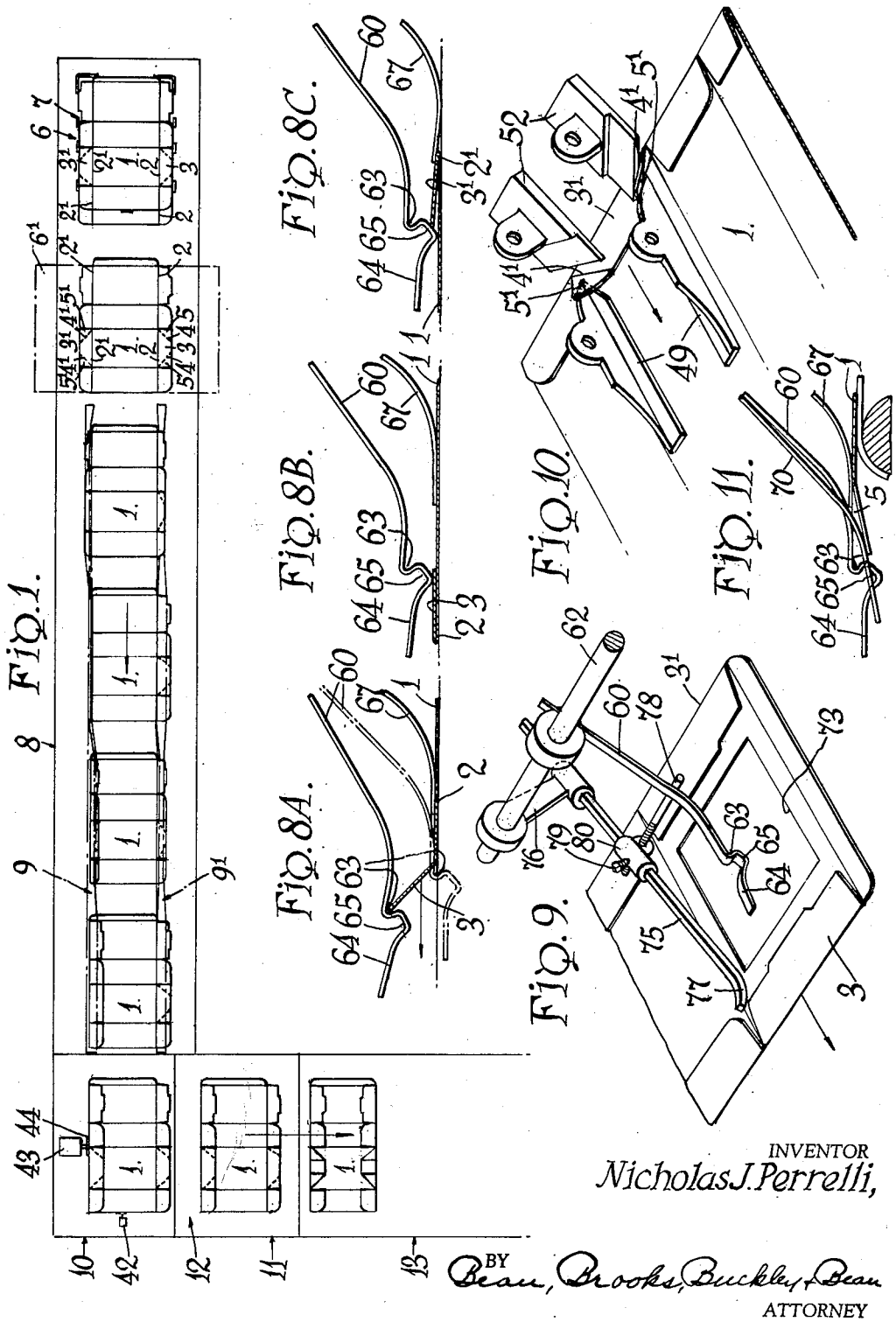
Nov. 26, 1963 N. J. PERRELLI 3,111,885

UNTIMED METHOD OF AND APPARATUS FOR MAKING CARTONS

Filed Aug. 22, 1960 3 Sheets-Sheet 1



INVENTOR
Nicholas J. Perrelli,

BY Beam, Brooks, Buckley & Beam
ATTORNEY

Nov. 26, 1963 N. J. PERRELLI 3,111,885

UNTIMED METHOD OF AND APPARATUS FOR MAKING CARTONS

Filed Aug. 22, 1960 3 Sheets-Sheet 2

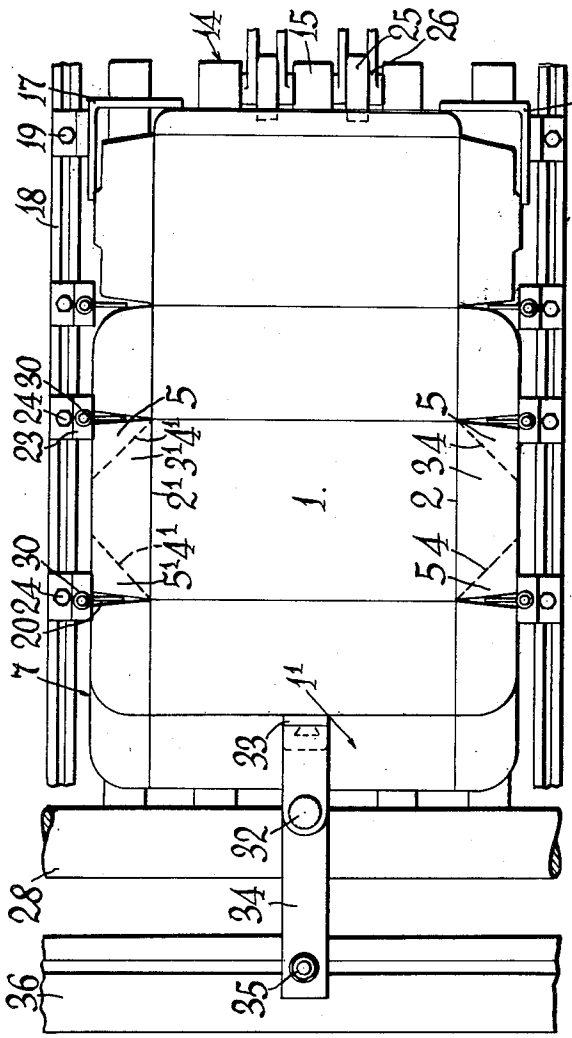


Fig. 2.

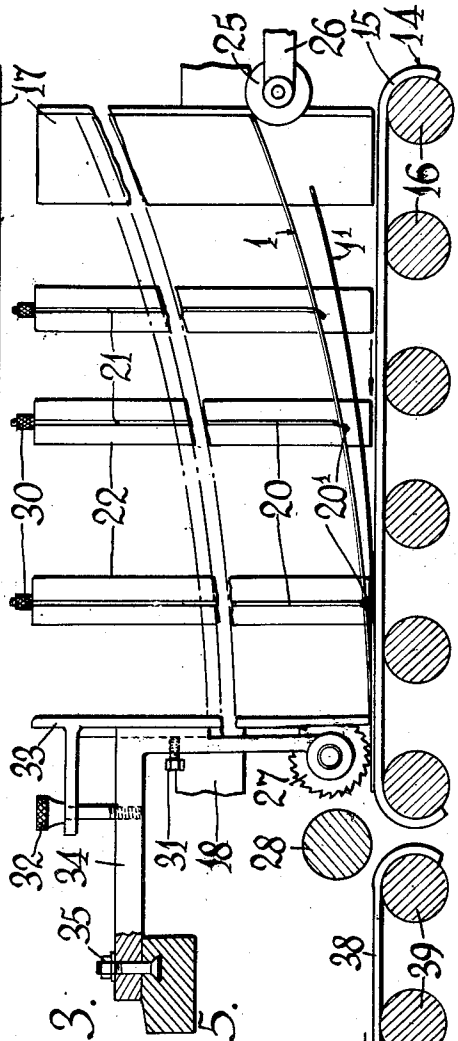


Fig. 3.

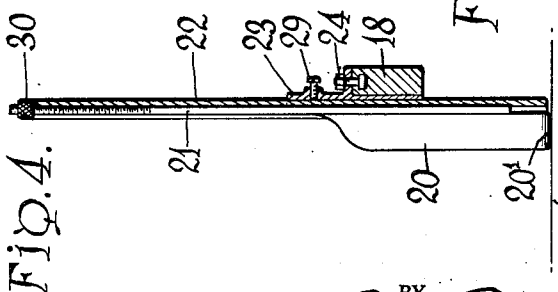


Fig. 4.

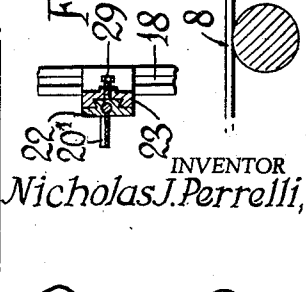


Fig. 5.

INVENTOR
Nicholas J. Perrelli,

BY
Bean, Brooks, Buckley & Bean
ATTORNEYS

Nov. 26, 1963 N. J. PERRELLI 3,111,885

UNTIMED METHOD OF AND APPARATUS FOR MAKING CARTONS

Filed Aug. 22, 1960 3 Sheets-Sheet 3

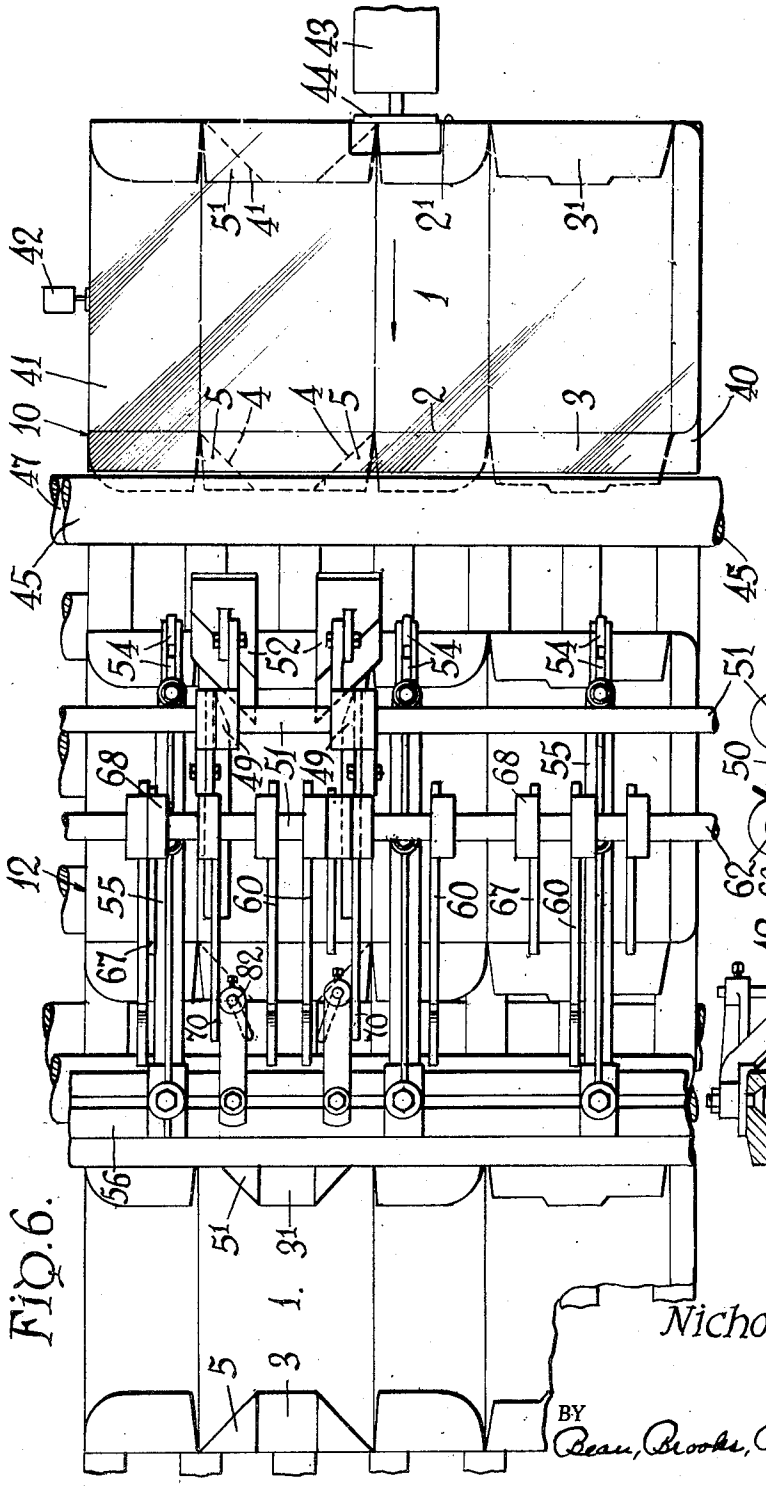


Fig. 6.

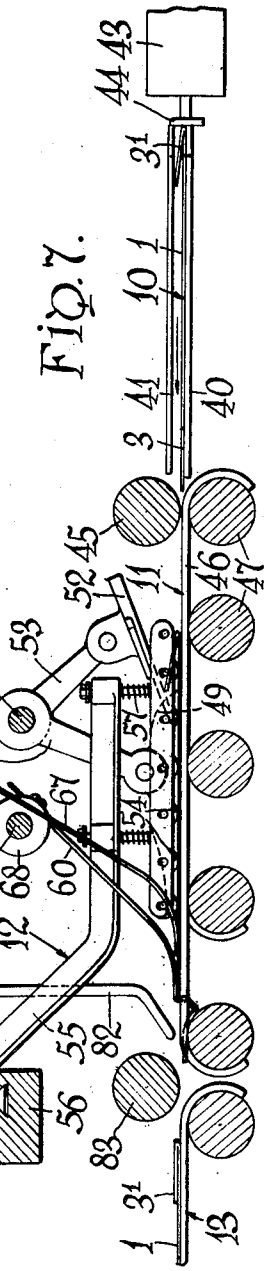


Fig. 7.

INVENTOR
Nicholas J. Perrelli,

BY
Beam, Brooks, Buckley & Beam.
ATTORNEYS

United States Patent Office 3,111,885 Patented Nov. 26, 1963

3,111,885
UNTIMED METHOD OF AND APPARATUS FOR MAKING CARTONS

Nicholas J. Perrelli, 885 West Ave., Buffalo, N.Y.

Filed Aug. 22, 1960, Ser. No. 50,972
19 Claims. (Cl. 93—49)

This invention relates generally to the paperboard carton art, and more specifically to a new and useful method of and apparatus for folding the flap portions of flat paperboard blanks.

In the folding of flat blanks which have been scored to provide flap portions reliance heretofore has been placed, for the most part, on mechanisms which are primarily of the timed type. Such mechanisms tend to be extremely complicated, and must be substantially perfectly synchronized throughout for proper operation. When a high speed of operation is desired, the maintenance of timed machines presents a very serious problem, and every time the mechanism gets out of synchronism and must be shut down a serious loss in time and labor occurs.

Accordingly, the primary object of my invention is to provide a method of and apparatus for folding paperboard blanks which is completely untimed throughout, and which can fold marginal flap portions at opposite sides of a blank, and also can fold angular tab portions of such flap portions, all without any synchronized timing mechanism whatever.

Another object of my invention is to provide the foregoing in a relatively simple and inexpensive arrangement which enables the pile feeding of flat blanks, and which is capable of very high speeds of operation.

In one aspect thereof, the method of my invention is characterized by the successive feeding of flat blanks along a first predetermined path extending generally in the direction of the score line defining the marginal flap portions, folding the marginal flap portions at one side of the blanks while the latter are being fed along the first path, then successively feeding the partially folded blanks along a second predetermined path extending at generally a right angle to the first path with the marginal flap portions at the other side of the blanks forming leading edges therefor, and folding the other side marginal flap portions while the latter are being fed along the second path.

In one aspect thereof, the apparatus of my invention is characterized by the provision of first conveyor means for successively feeding flat blanks along a first predetermined path extending generally in the direction of the score lines to a transfer station, feeding means for successively delivering flat blanks to the first conveyor means, folding means extending along the first conveyor means in the path of the marginal flap portions along one side of the blanks, the folding means being engaged by the marginal flap portions at that side of the blanks and progressively folding the same onto the associated blanks in response to forward movement of the latter, second conveyor means for successively feeding the partially folded blanks along a second predetermined path extending from the transfer station transversely of the first path with the marginal flap portions at the other side of the blanks comprising leading edges therefor, transfer means automatically operable in response to the arrival of a partially folded blank at the transfer station to transfer that blank from the first conveyor to the second conveyor, and second folding means positioned in the second path to resist forward movement of the marginal flap portion at the other side of the blanks and thereby fold the same onto the associated blanks.

The method and apparatus of my invention also have other characterizing aspects, and all of the objects, advantages and characterizing features of my invention will become apparent from the ensuing detailed description of

a presently preferred embodiment thereof, which embodiment is illustrated in the accompanying drawings wherein like reference numerals denote like parts throughout the various views and wherein:

FIG. 1 is a generally diagrammatic plan view illustrating successive steps in the method of my invention, and the general layout of the apparatus of my invention;

FIG. 2 is a top plan view of the feeding means of my invention;

FIG. 3 is a side elevational view thereof, broken away for ease of illustration;

FIG. 4 is a vertical sectional view of one of the feed guide vanes;

FIG. 5 is a horizontal sectional view thereof;

FIG. 6 is a top plan view of the transfer mechanism, and leading flap folding and trailing flap tab folding mechanisms of my invention;

FIG. 7 is a side elevational view thereof;

FIGS. 8A, 8B and 8C are diagrammatic views illustrating successive steps in the passage of a partially folded blank past the leading edge flap folding mechanism;

FIG. 9 is a fragmentary perspective view of a support for the leading flap pick-up finger;

FIG. 10 is a fragmentary perspective view of the trailing flap tab folding mechanism of my invention; and

FIG. 11 is a diagrammatic view illustrating a further detail of the leading edge flap folding mechanism.

Referring in detail to the illustrative embodiment depicted in the accompanying drawings, my invention is adapted to fold initially flat, paperboard blanks such as those designated 1, each of which is scored along lines 2 and 2' to provide marginal flap portions 3 and 3', respectively, at opposite sides of the blanks. In addition, certain of the marginal flap portions 3, 3' are provided with score lines 4, 4' to define angle tabs 5, 5', respectively. In the illustrated embodiment, it is intended that all of the marginal flap portions 3, 3' be folded over onto the top face of the blanks 1, although it will become obvious that, if desired, certain ones only of said marginal flap portions 3, 3' might be folded.

The flat blanks 1 are initially piled in a stack at a feeding station 6, for delivery by a feeding mechanism, generally designated 7, onto a first conveyor 8 for being moved thereby along a first path extending generally in the direction of the score lines 2, 2'. While the blanks 1 are being fed in succession along the first path by conveyor 8, the marginal flap portions 3' are folded onto the top face of the blanks 1 by a progressive frame-and-swords or other folding mechanism, of a type known per se, generally designated 9 (FIG. 1). The details of the folding mechanism 9 are not essential to my invention, the important thing being that the mechanism is untimed, and folds the flaps 3' automatically, and progressively, by the forward movement of the blanks 1.

The partially folded blanks 1 are delivered by conveyor 8 to a transfer station 10, at which point they are automatically transfered to a second conveyor 11 which conveys the partially folded blanks at generally a right angle to the first conveyor 8, past a mechanism, generally designated 12 (FIGS. 6 and 7), which folds the other side marginal flap portions 3 onto the blanks. Following that, the folded blanks move onto a third conveyor 13 (FIG. 7) which delivers them to adhesive applying means or to any other desired mechanism or station comprising per se no part of my invention.

The feed mechanism 7 (FIGS. 2–5) at the feeding station 6, comprises an endless conveyor 14 consisting of a series of laterally spaced conveyor belts 15 trained over a series of rollers 16 and driven in a known manner by means not illustrated. Conveyor 14 is positioned below a flat blank stacking frame of the type comprising a pair of angle members 17 slidably adjustable lengthwise

along a pair of side frame members **18**. Angle members **17** are releasably secured in adjusted position, as by fasteners **19**, and define opposite corners of the feeding mechanism which is adapted to receive a stack of pile of flat blanks **1** arranged substantially horizontally in superposed relation. The blanks are supported in the rearwardly upwardly curving condition illustrated in FIG. 3 by the conveyor **14** which supports the front of the pile, and by the rear flanges of the angles **17** which support the rear edges of the blanks. Rollers **25** also help to support the stack, but are primarily for the purpose of preventing lateral sagging of the blanks.

In this way, as the upper, conveying flight of conveyor **14** moves toward the left in FIG. 3 it engages the bottom blank **1**, sliding it forwardly and downwardly as indicated at **1'** (FIGS. 2 and 3), moving that blank outwardly from the stack of blanks beneath a toothed wheel **27**, which can be spring backed, and a hold down roller **28** and onto the first conveyor **8**. As the bottom blank **1'** moves outwardly from beneath the pile of blanks, the pile shifts downwardly to again engage the conveyor, and this settling is aided by rotation of the wheel **27** which is in engagement with the stack of blanks, for moving the same downwardly, as well as with the blank being fed, for being rotated thereby. The conveyor belts **15** then engage the forward bottom edge of the next succeeding blank, and commence to move that blank forwardly, in this way, the blanks **1** are delivered in predetermined succession, one after another, from the bottom of the pile of blanks onto the first conveyor **8**.

The marginal flap portions **3**, **3'** of the blanks **1** each comprise, in the illustrated embodiment, a series of individual flaps spaced apart by generally V-shaped notches cut out of the blanks in a manner which is known in the art, and this presents a serious problem to pile feeding because the flap edges of the bottom blanks **1'** have a distinct tendency to catch against the flap edges of the immediately superposed blank, which prevents the bottom blank from moving forwardly in the manner desired. That problem is effectively and efficiently solved by my invention by the provision of separators or guide members **20** in the form of vertically elongated, thin metal leaves which extend downwardly through the vertically alined notches between the flaps of the superposed blanks. The members **20** terminate at their lower edge in forwardly curving lips **20'** which cam the flaps of the bottom blank under the flaps of the blank immediately above. In this way, interference between blanks is avoided. Each guide vane **20** is carried by an upright rod **21** vertically adjustable in a key **22** which is vertically adjustable in a support bracket **23**. Brackets **23** are slidably adjustable along the side frame members **18**, and are releasably locked in adjusted position by the fasteners **24**. The guide vanes **20** are supported with their lips **20'** at progressively higher elevations thereby to match the upward and rearward curvature of the stacked blanks as shown in FIG. 3.

Obviously, the blanks can have flap configurations and arrangements other than that illustrated, and it will be observed that the guide vanes **20** are readily adjusted to fit the particular pattern of the blanks to be folded. The vanes **20** are capable of vertical adjustment, by rotating the nut **30**, and this will move the vane lips **20'** to the elevations required to match the desired curvature facilitating the forward movement of the bottom blanks one at a time in an orderly succession. The keys or uprights **22** also can be vertically adjusted, by loosening the set screws **29**, and the plan view position of the guide vanes **20** can be adjusted by simply loosening the fastenings **24** and then sliding the brackets **23** along the side frame members **18** to the desired position. Similarly, where it is desired to accommodate blanks of different thickness, feed guide post **33** can be raised or lowered, by lossening the set screw **31** and then turning the jack screw **32** in the desired direction, to move the post **33** relative to the wheel supporting bracket **34**. Similarly, wheel **27** and post **33** can be shifted laterally by loosening the nut **35** which locks the supporting bracket **34** in adjusted position along the guide member **36**. The uprights **22** act as guides for the opposite sides of the stack of blanks, and with the corner angles **17** facilitate the stacking of the blanks at the feed station **6**. The vanes **20** assist guide post **33** in maintaining the stacked relation of the blanks during the feeding operation.

The first conveyor **8** comprises a series of laterally spaced conveyor belts **38** trained about rollers **39** which are driven in known manner, by suitable means not illustrated, at a speed of travel faster than conveyor **14** to space apart successive blanks. As the blanks **1** are conveyed in succession along the first path by the conveyor **8**, the marginal flaps **3'** are folded over onto the blanks **1** by a frame and sword mechanism **9** which can be of any known construction. Similarly, the flaps **3** are flexed in opposite directions by an appropriate mechanism of known construction, indicated fragmentarily at **9'** (FIG. 1). They are first flexed upwardly, to break the blanks along the score lines **2** and thereby facilitate the subsequent folding of these flap portions. They are then flexed downwardly, to restore the flaps to a flat condition to avoid undesired interference with the trailing flap angle folding mechanism of FIG. 10. The mechanisms **9** and **9'** are untimed, and translate the forward motion of the blanks into folding and flexing of the flaps.

The conveyor **8** delivers the partially folded blanks **1** to the transfer station **10**, which includes a plate **40** supporting the blanks **1** and a plate **41** holding the flap portions **3'** in folded condition. It will be observed that, at this point, the angular tab portions **5'** have not been folded, but only the marginal flaps **3'** containing the same. As the partially folded blanks **1** are received at the transfer station, they actuate a switch **42** which is arranged in controlling relation to the energizing circuit (not illustrated, but the known type per se) for a solenoid actuated kicker **43** having a plunger with a head **44** engaging the folded edge of the carton **1**. When the kicker **43** is actuated it moves the blank in the direction of the arrow (FIGS. 6 and 7) beneath a hold down roller **45** onto the conveyor **11**, which comprises a series of laterally spaced belts **46** moving on rollers **47** driven in known manner by means not illustrated.

As the partially folded blanks **1** are picked up by the conveyor **11** and delivered along the second path, it will be seen that the folded marginal flap portions **3'** present a leading edge, at a point midway between the opposite sides of the blanks. In the particular embodiment illustrated in FIGS. 6, 7 and 10, the forward movement of the angular tabs **5'** is resisted by means of angle rods **49** supported on arms **50** adjustably positioned on support rod **51**, whereby continued forward movement of the blank causes the tab portions **5'** to be flexed upwardly, and folded about the score lines **4'**. The flap **3'** containing the angles **5'** is held in folded condition by the hold down members **52**, with the result that the tabs **5'** are folded over onto the upper face of the associated flap **3'**, this being the under surface of the flat blanks, and the tabs **5'** are held in folded condition by the angle rods **49** as they pass therebeneath. The hold down members **52** are supported on arms **53** carried by the support rod **51**, whereby the position of the angle folding members **49** and **52** can be adjusted relative to each other, both about and along the support rod **51**, and set screws or other means, not illustrated, can be provided to hold the hubs of arms **50**, **53** in adjusted position. Also, the members **49**, **52** can be positionally adjusted on their supporting arms **50**, **53**.

As the partially folded blanks **1** pass beneath the folding mechanism **12**, they are held against conveyor **11** by means of hold down rollers **54** carried by arms **55** adjustable along a supporting member **56**, the hold down rollers being vertically shiftable as required to accommo-

date the varying thickness of the partially folded blank, and having backing springs 57 for urging the rollers 54' against the blanks 1.

The marginal flap portions 3 provide the leading edge of the partially folded blanks as they are fed by the conveyor 11, and they are upfolded onto the top surface of the blanks by resisting the forward movement thereof. The means for accomplishing this are illustrated in FIGS. 6–11 and comprise an elongated first finger 60 mounted adjacent one end in a hub 61 carried by a support rod 62. One or more fingers 60 are provided for each flap 3 to be folded, and each finger 60 is formed adjacent its opposite end with a reverse bent portion providing a shoulder 63 leading to an elongated terminal portion 64. The hubs 61 are adjustable about and along support 62.

The fingers 60 are arranged so that the terminal portions 64 extend between the conveyor belts 46 and below the plane of the blanks 1, whereby as each blank advances the fingers 60 are in the position relative thereto indicated in phantom in FIG. 8A. The forward movement of the blank 1 causes the flaps 3 to engage in the shoulders 63, whereupon continued forward movement of the flaps 3 is prevented with the result that the flaps 3 are folded upwardly as the blank continues to move. The fingers 60 yield as illustrated in full lines in FIG. 8A, and finally fold the flaps 3 over onto the top surface of the associated blank 1, as illustrated in FIG. 8B. At this point, the downwardly extending, spacing portion 65 between each shoulder 63 and terminal 64 bears against the flap 3, and subsequently against the blank 1, to maintain the shoulder 63 elevated thereabove.

Associated with the pickup fingers 60 are hold-down fingers 67, which also are carried by hubs 68 adjustable around and along the support rod 62. Fingers 67 curve forwardly, for riding over the blanks 1 and the folded marginal flaps 3'. The hold-down fingers 67 serve two very important purposes. First, they engage the blank 1 at a position behind the shoulder 63 of the pickup finger 60, and at the moment of initial engagement of the shoulder 63 with the flap 3, the hold-down finger 67 bears against the flap 3 at a point between its leading edge and the score line 2. As a result, the initial pick-up action of the finger 60 on the flap 3 flexes it upwardly, with the hold-down finger 67 shifting progressively rearwardly along the flap and across the score line 2 as the blank continues to move and the flap 3 is folded to the position illustrated in FIG. 8A. This flexing pick-up action causes the blank to break smoothly at the score line 2.

Second, the hold-down finger 67 serves to hold the flaps 3' in folded condition, out of engagement with the shoulder 63 as the flaps 3' pass beneath the pickup finger 60. If the flaps 3' were not held down, their natural resiliency would cause them to spring up and engage the shoulder 63 and be unfolded. With the hold-down finger 67 this undesirable possibility is avoided.

Another significant feature of my invention resides in the arrangement for folding the angles 5. These comprise elongated angle breaking fingers 70 (FIG. 6) which normally project downwardly between the conveyor belts 46, below the plane of the blank 1, and which engage the leading edges of the angles 5 before the leading edge of the associated flap 3 is engaged by the pickup finger 60. With this arrangement, the angles are first flexed or warped downwardly (see FIG. 11), and then the associated flap 3 is pulled up by the spring finger 60 while the angles 5 are held down, first by the fingers 70 and then by the rods 82, whereby the angles 5 are folded over onto the upper surface of the folded flap 3, comprising the undersurface of the original blank. Such initial flexing of the angles 5 greatly facilitates the simultaneous folding of angles 5 and the associated flap 3. The rods 82 continue to hold down the angles 5, and subsequently hold down the angles 5' as the blank passes from the folding mechanism 12 beneath hold down roller 83. If desired angle folding rods 49 could be extended to replace rods 82.

The fingers 70 are mounted in hubs adjustable about and along the support 62. Fingers 67 and 70 can be of resilient material, as shown, or can have a torsion spring or other resiliently yieldable connection to their support (not illustrated). Fingers 60, however are subject to much more stress, and therefore preferably are of relatively stiff material having such a resiliently yieldable connection to their support, or at some other point.

Where the blanks have a window opening 73, and it is desired to hold the shoulder 63 of the pick-up finger 60 out of the window, a support rod 75 is provided (FIG. 9). Rod 75 is carried by a crank 76 adjustable around and along the support 62, and has a curved terminal 77 adapted to engage and ride along the blank. Rod 75 carries a lateral extension 78 which supports the finger 60 out of the opening or window 73. The shoulder 63 is free to engage the leading edge of the blank, however, because the support rod terminal 77 is positioned ahead of the shoulder 63 and therefore does not support the shoulder off the plane of the blank until after the leading marginal flaps have been folded. The position of the lateral extension 78 along the support rod 75 is readily adjusted, by loosening set screw 79 carried by the sleeve 80.

If folding and/or other operations are required, it is contemplated that they might be performed adjacent the feeding station, in the area designated 6' (FIG. 1).

Accordingly, it is seen that my invention fully accomplishes its intended objects. The apparatus is completely untimed, throughout, and is extremely flexible to accommodate different types of cartons, flaps, and angles. The apparatus is relatively simple and inexpensive, and the method of my invention is easily performed. While I have disclosed but one embodiment, that is done by way of illustration only and without thought of limitation. I realize that this embodiment is susceptible of modification and variation without departing from the spirit of my invention or the scope of the appended claims.

Having fully disclosed and completely described my invention, and its mode of operation, what I claim as new is:

1. The method of folding flat paperboard blanks each scored along lines adjacent opposite sides thereof to provide marginal flap portions thereat which comprises, successively feeding the flat blanks along a first predetermined path extending generally in the direction of said score lines, folding the flap portions at one side of the blanks onto the associated blanks while the latter are being fed along said first path, then successively feeding the partially folded blanks along a second predetermined path extending transversely of said first path with the marginal flap portions at the other side of the blanks forming leading edges therefor and while holding the one side marginal flap portions in folded condition, and folding said other side marginal flap portions onto the associated blanks while the latter are being fed along said second path, all of the foregoing being accomplished in an untimed manner.

2. The method set forth in claim 1, together with the step of flexing said other side marginal flap portions in opposite directions about the associated score lines while the blanks are being fed along said first path, thereby maintaining said other side marginal flap portions generally flat while facilitating subsequent folding thereof.

3. The method set forth in claim 1, wherein said other side marginal flap portions are folded by resisting forward movement thereof along said second path.

4. The method set forth in claim 1, wherein said one side marginal flap portions are scored along lines providing an angle tab portion at a corner thereof, said angle tab portions being folded onto the associated marginal flap portions by resisting forward movement of said angle tab portions and simultaneously holding the associated mar-

ginal flap portions in folded condition while the associated blanks are being fed along said second path.

5. The method set forth in claim 3, wherein said other side marginal flap portions are scored along lines providing an angle tab portion at a corner thereof, said angle tab portions being folded onto the associated marginal flap portions by initially flexing them downwardly and then holding said angle tab portions down as said other side marginal flap portions are folded onto the associated blanks.

6. The method of folding flat paperboard blanks each scored to provide a marginal flap portion, said marginal flap portions being scored to provide an angle tab portion, which method comprises, folding said marginal flap portions onto the faces of the assoicated blanks, successively feeding the partially folded blanks along a predetermined path in a direction such that said folded flap portions present leading edges, and folding said angle tab portions by resisting forward movement thereof and simultaneously holding the associated marginal flap portions in folded condition while the associated blanks are being fed along said path.

7. The method of folding flat paperboard blanks each scored to provide a marginal flap portion, said marginal flap portions being scored to provide an angle tab portion, which method comprises, successively feeding the blanks along a predetermined path in a direction such that said marginal flap portions present leading edges, and folding said marginal flap portions upwardly onto said blanks and simultaneously folding said angle tab portions downwardly onto said marginal flap portions by first flexing said angle tab portions downwardly and then resisting forward movement of said marginal flap portions while holding down said angle tab portions as the associated blanks are being fed along said path.

8. The method of folding flat paperboard blanks each scored along a line providing a marginal flap portion comprising, successively feeding the blanks along a predetermined path in a direction such that said marginal flap portions present leading edges, and folding said marginal flap portions onto the associated blanks by resisting forward movement of said marginal flap portions and simultaneously initially holding down said marginal flap portions at a point initially located between said leading edges and said score lines and progressively shifting rearwardly toward and then beyond said score lines while the blanks are being fed along said path.

9. The method of folding flat paperboard blanks each scored along lines adjacent opposite sides thereof to provide marginal flap portions thereat, said opposite side marginal flap portions being scored along lines providing angle tab portions, which method comprises, successively feeding the flat blanks along a first predetermined path extending generally in the direction of said marginal flap score lines, folding the flap portions at one side of the blanks onto the associated blanks while the latter are being fed along said first path, then successively feeding the partially folded blanks along a second path extending transversely of said first path with the marginal flap portions at the other side of the blanks forming leading edges therefor, folding said one side marginal flap angle tab portions by resisting forward movement thereof and simultaneously holding the associated marginal flap portions in folded condition while the associated blanks are being fed along said second path, and folding said other side marginal flap portions and angle tab portions associated therewith as the blanks are being fed along said second path by flexing said other side marginal flap angle tab portions downwardly and then resisting forward movement of said other side marginal flap portions while holding down the associated angle tab portions and simultaneously initially holding down said other side marginal flap portions at a point initially located between said leading edges and said other side marginal flap score lines and progressively shifting rearwardly as said other side marginal flap portions are folded.

10. Untimed apparatus for folding flat paperboard blanks scored along lines adjacent opposite sides thereof to provide marginal flap portions thereat comprising, first conveyor means for successively feeding flat blanks along a first predetermined path extending generally in the direction of said score lines to a transfer section, feed means for successively delivering flat blanks to said first conveyor means, folding means extending along said first conveyor means in the path of the marginal flap portions along one side of said blanks, said folding means being engaged by said one side marginal flap portions and progressively folding the same onto the associated blanks upon forward movement of the blanks along said first path, second conveyor means for successively feeding the partially folded blanks along a second predetermined path extending from said transfer station transversely of said first path from the side thereof opposite said first folding means, transfer means automatically operable upon arrival of a partially folded blank at said transfer station to transfer such blank to said second conveyor means, means for holding the marginal flap portions along said one side of said blanks in folded condition while said blanks are being fed along said second path by said second conveyor means, and second folding means positioned in said second path to resist forward movement of the marginal flap portions at the other side of the blanks and thereby fold said other side marginal flap portions onto the associated blanks.

11. The untimed folding apparatus set forth in claim 10, wherein said one side marginal flap portions are scored to provide an angle tab portion, together with means for folding said angle tab portions onto the associated flap portions while the blanks are being fed along said second path, said last-named folding means comprising first means resisting forward movement of said angle tab portions, and second means simultaneously holding the associated flap portions in folded condition.

12. The untimed folding apparatus set forth in claim 10, wherein said second folding means comprise an elongated yieldable first finger supported adjacent one end and provided adjacent its other end with a shoulder, said finger normally projecting through the plane of the blanks in said second path with said shoulder positioned in said second path, said shoulder engaging said other side marginal flap portions and resisting forward movement thereof thereby to fold said other side marginal flap portions over onto the associated blanks, and an elongated yieldable second finger supported adjacent one end thereof and having adjacent its opposite end a hold-down portion positioned to bear on successive blanks at a point behind said first finger shoulder, said second finger holding said one side marginal flap portions in folded condition out of engagement with said first finger shoulder.

13. The untimed apparatus set forth in claim 12, wherein said other end of said first finger is elongated in the general direction of said second path a substantial distance beyond said shoulder thereby to continue holding said one side marginal flap portions in folded condition as they pass beyond said shoulder.

14. The untimed apparatus set forth in claim 12, wherein said other side marginal flap portions are scored along lines providing an angle tab portion, together with a yieldable angle breaking finger comprising part of said second folding means, said angle breaking finger projecting through the plane of said second path in position to engage said angle tab portions and flex the same prior to engagement of the associated flap portions by said first finger.

15. Untimed apparatus for folding paperboard blanks each having a flap scored to provide an angle tab portion, the flaps being folded onto the blanks, which apparatus comprises, means for conveying successive blanks along a predetermined path with the folded flaps thereof in-

clining upwardly and forwardly, angle breaking means positioned along said path to resist forward movement of the angle tab portion of successive blanks, and hold-down means positioned along said path to simultaneously hold down the associated flap of successive blanks.

16. Untimed apparatus for folding paperboard blanks each having a flap comprising, means for conveying successive blanks along a predetermined path with the flaps thereof comprising a leading edge, an elongated resiliently yieldable pick-up finger projecting through said path and formed with a shoulder positioned to engage the flap of successive blanks and resist forward movement thereof, and resiliently yieldable hold-down finger positioned to bear against the flap of successive blanks as the same are engaged by said shoulder of said pick-up finger, said pick-up finger thereby initially flexing the flap.

17. Untimed apparatus as set forth in claim 16, wherein each of said flaps is scored to provide an angle tab, together with an angle breaking finger projecting through the plane of said path and positioned to engage the angle tab of successive blanks and flex the same downwardly prior to and during initial engagement of the associated flap by the shoulder of said pick-up finger.

18. Untimed apparatus as set forth in claim 17, together with a hold-down rod positioned to hold down the angle tab of successive blanks as the associated flaps are folded over by said pick up finger.

19. Untimed apparatus as set forth in claim 16, together with a supporting finger positioned adjacent said pick-up finger and having a lateral extension positioned behind said pick-up finger to lift the same, said supporting finger being movable in a vertical plane and having a portion normally projecting through the plane of said path ahead of the shoulder of said pick-up finger, said supporting finger portion being positioned to bear on successive blanks and thereby lift said pick-up finger shoulder above the plane of such blanks.

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