Oct. 9, 1956 H. F. WISCHUSEN 2,765,714

BOX BLANK FOLDING MACHINE AND METHOD

Filed June 3, 1955 6 Sheets-Sheet 1

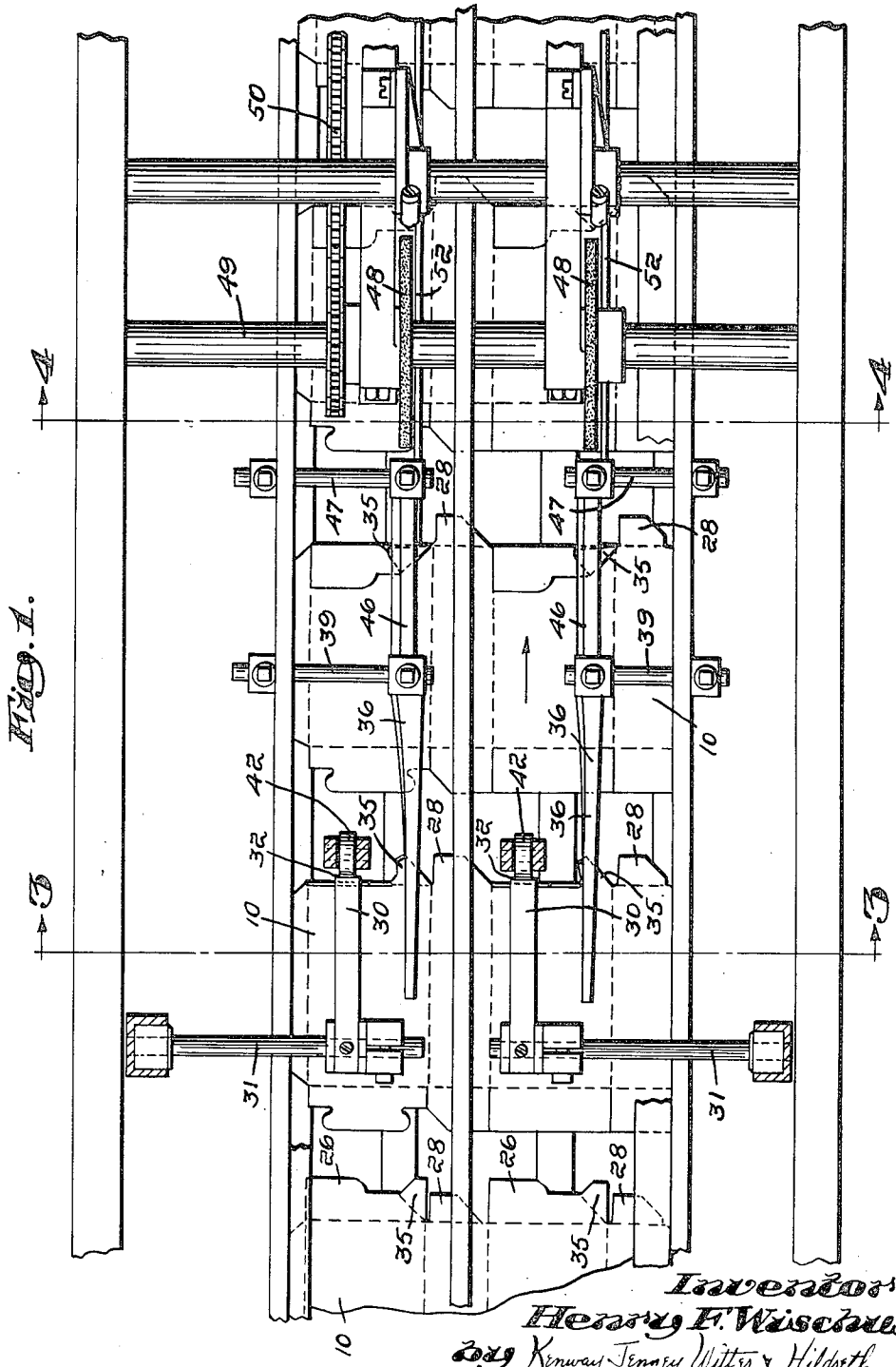


Fig. 1.

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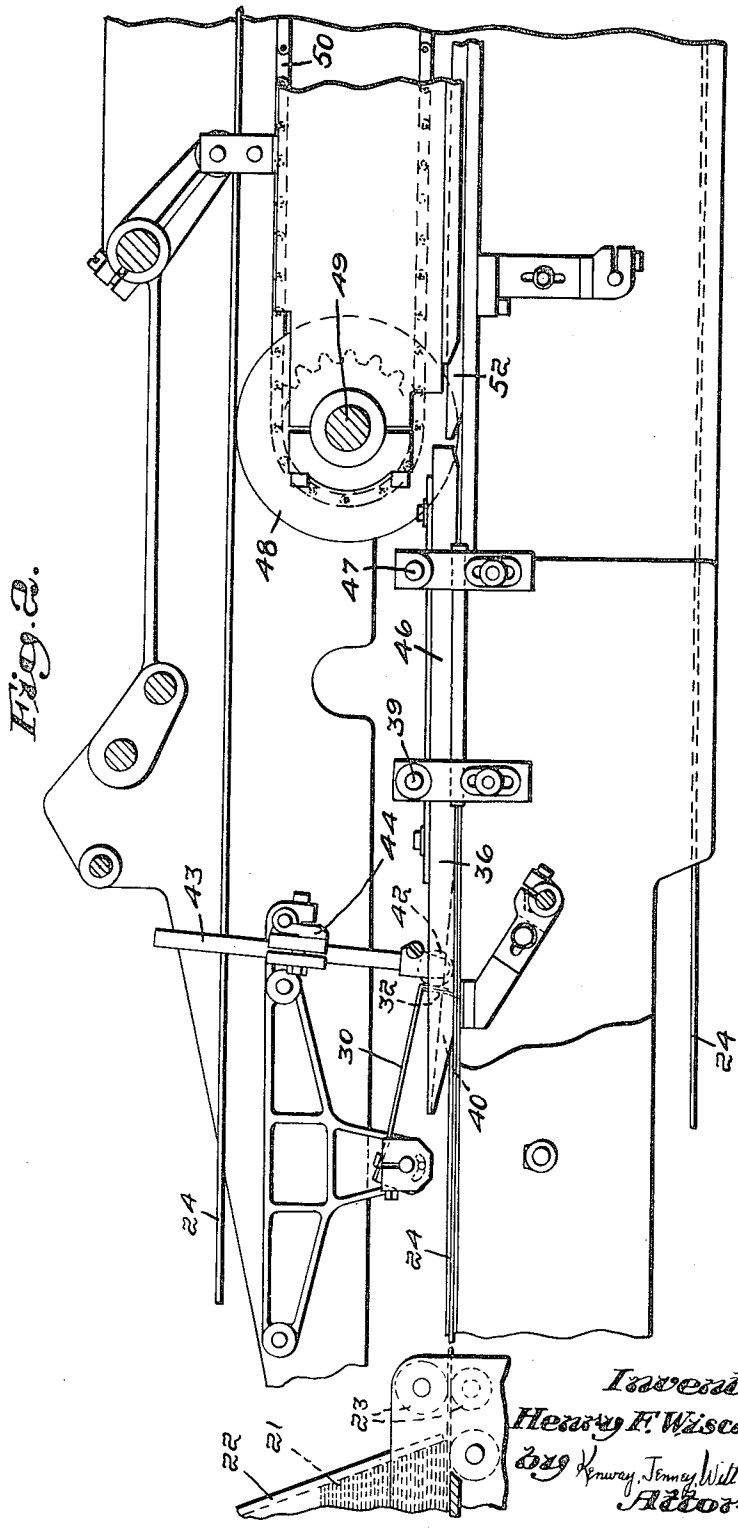


Fig. 2.

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BOX BLANK FOLDING MACHINE AND METHOD

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Fig. 3.

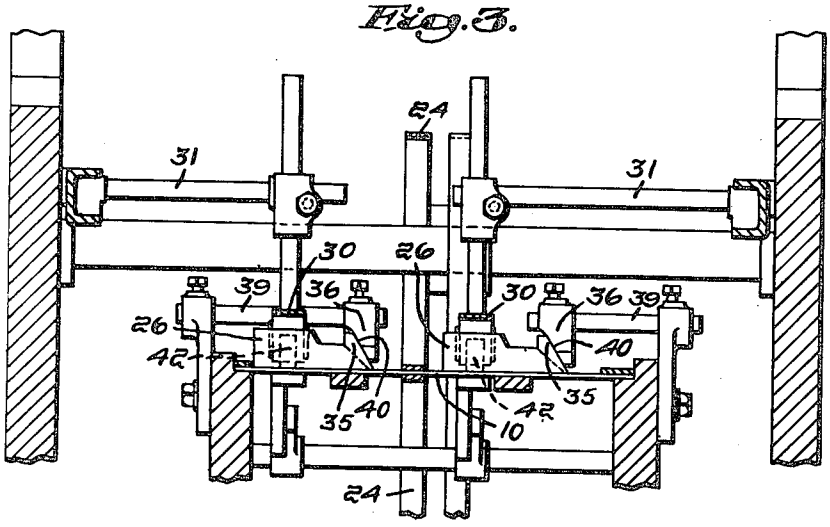
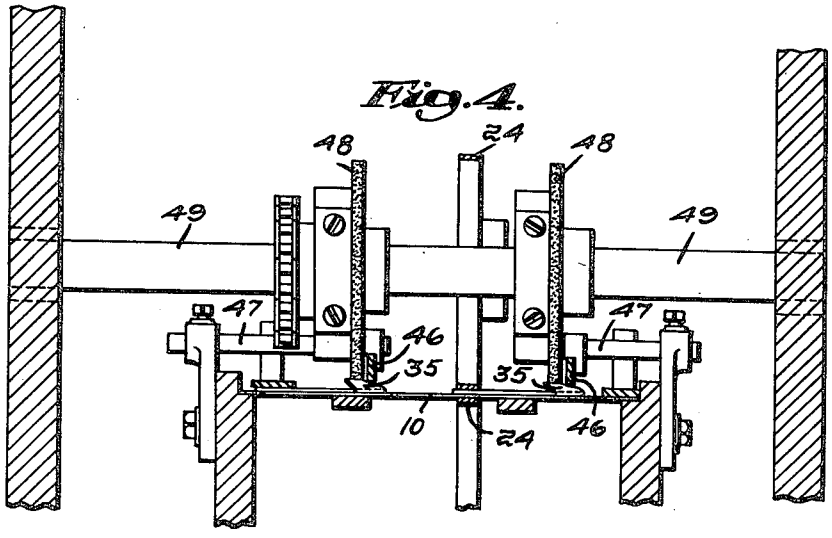


Fig. 4.



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BOX BLANK FOLDING MACHINE AND METHOD

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Fig. 5.

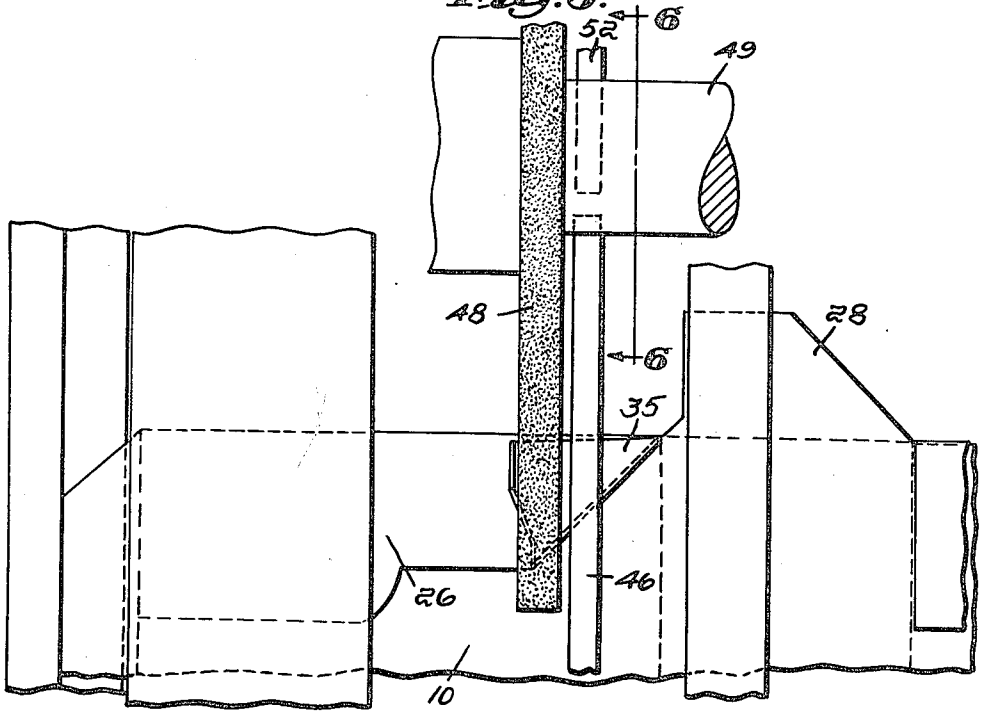


Fig. 6.

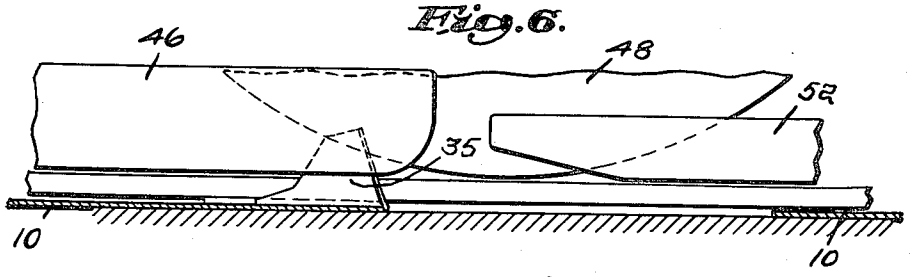
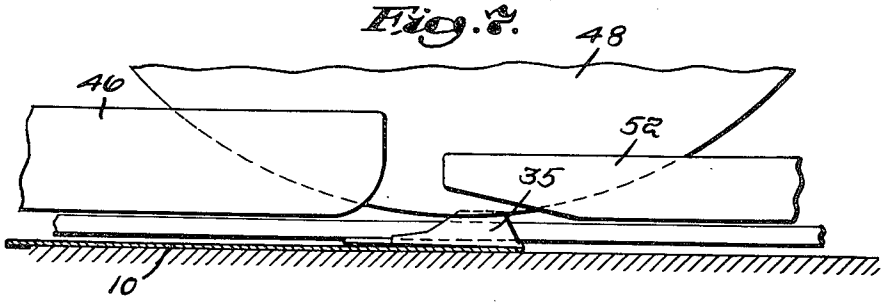


Fig. 7.



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BOX BLANK FOLDING MACHINE AND METHOD

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Fig. 8.

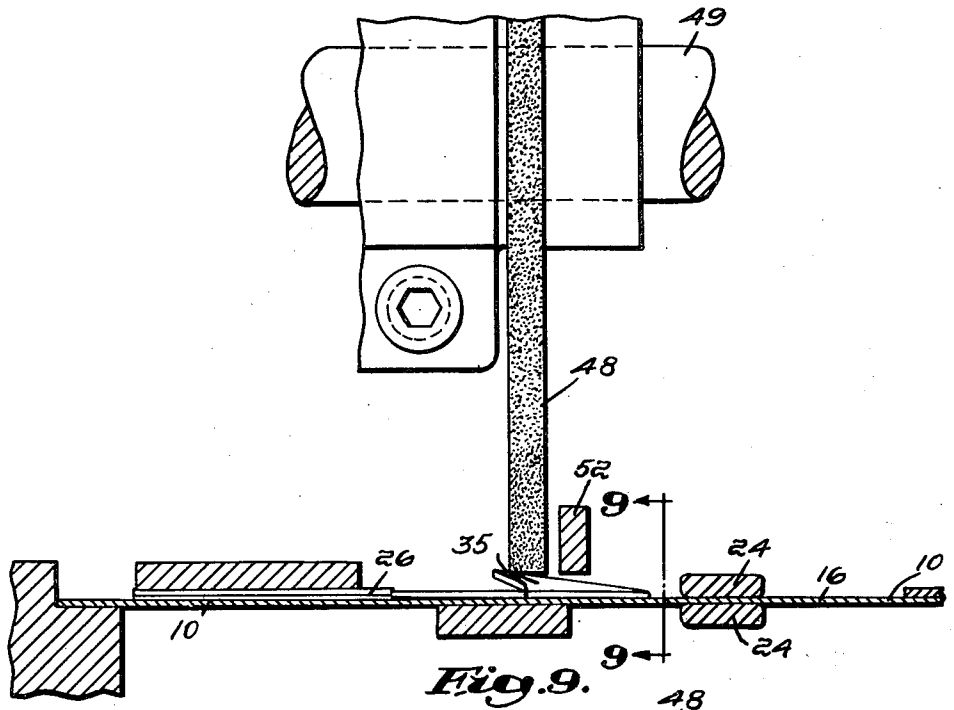


Fig. 9.

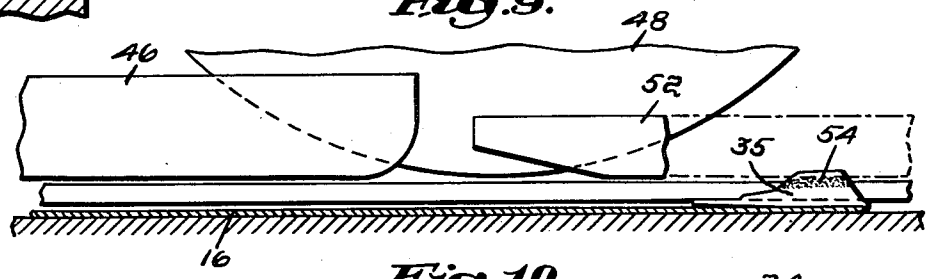
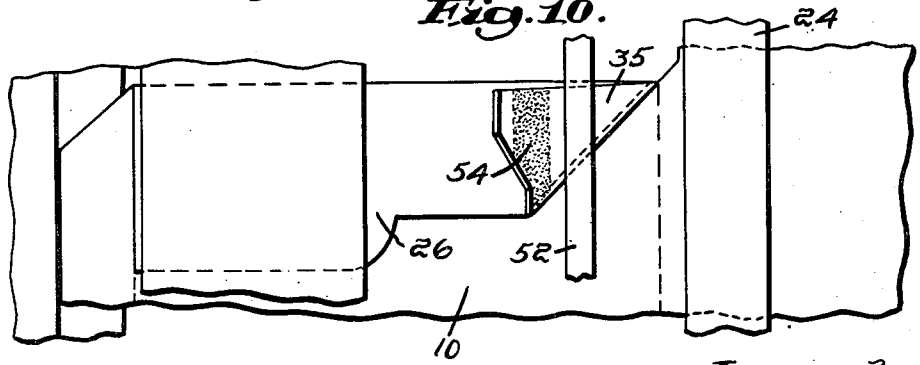


Fig. 10.



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BOX BLANK FOLDING MACHINE AND METHOD

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Fig. 11.

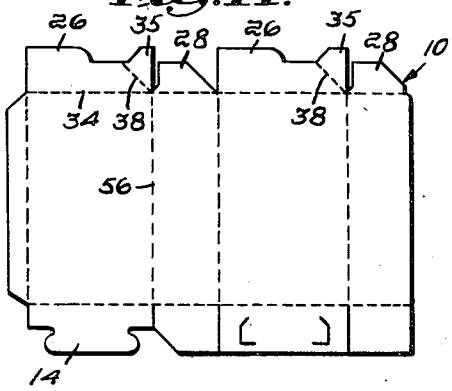


Fig. 12.

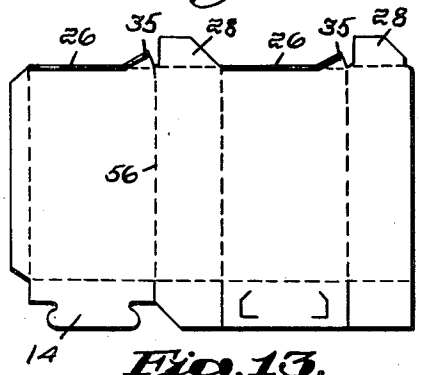


Fig. 13.

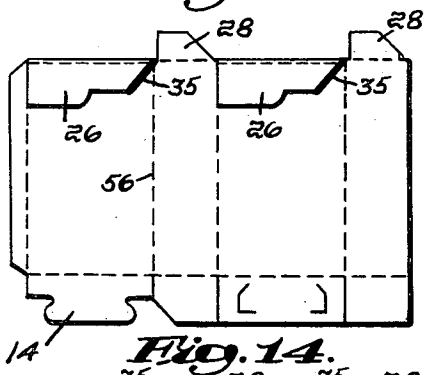


Fig. 14.

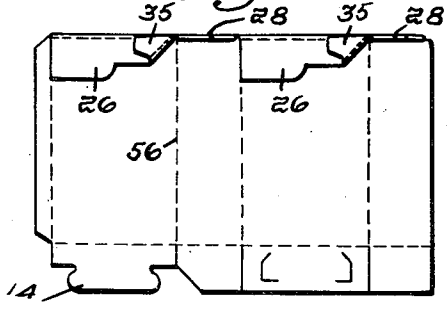


Fig. 15.

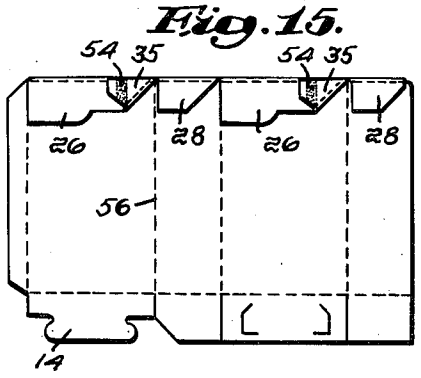


Fig. 16.

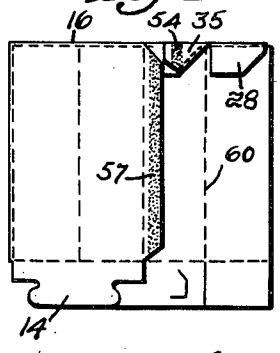


Fig. 17.

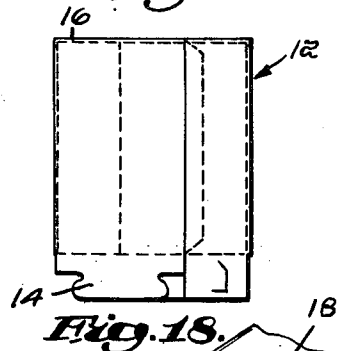
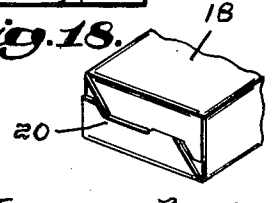


Fig. 18.



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United States Patent Office

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BOX BLANK FOLDING MACHINE AND METHOD

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Application June 3, 1955, Serial No. 512,966

3 Claims. (Cl. 93—49)

This invention relates to a novel method and machine for folding scored paper blanks to box forming configuration and applying bonding adhesive thereto. Machines for performing this operation have commonly employed endless conveyors for feeding blanks through the machine and mechanism operated in timed relation therewith for folding the blanks and applying the adhesive. Such timing requirement not only renders the machine complex and expensive but furthermore substantially limits the possible operating speed. A primary object of my invention resides in the production of a novel method and machine for this purpose in which the timing requirement is eliminated and which can be operated at very substantially higher speeds than have been heretofore possible.

The machine employing the invention includes cooperating carrier belts for engaging and conveying blanks continuously and successively along a predetermined path therebetween, means disposed in the path for engaging marginal flap portions of the blanks and folding them over in overlapping relation onto the blanks and an adhesive coated applicator disposed thereafter to contact and apply adhesive to the top faces of the folded flap portions, all continuously as the blanks are carried through the machine. The production of novel mechanism of this nature and for the purpose described, operating successively and continuously on the moving blanks without the employment of timing mechanism, comprises a further object of the invention.

These and other features of the invention will be more readily understood and appreciated from the following detailed description of a preferred embodiment thereof, selected for purposes of illustration and shown in the accompanying drawings, in which—

Fig. 1 is a fragmentary plan view of a machine embodying the invention,

Fig. 2 is a side elevation thereof,

Fig. 3 is a sectional view taken on line 3—3 of Fig. 1,

Fig. 4 is a sectional view taken on line 4—4 of Fig. 1,

Fig. 5 is an enlarged fragmentary plan of the adhesive applying mechanism,

Fig. 6 is a fragmentary elevation taken on line 6—6 of Fig. 5 and showing the blank approaching the adhesive applying wheel,

Fig. 7 is a like view showing the adhesive being applied,

Fig. 8 is a fragmentary elevation of the adhesive applying mechanism,

Fig. 9 is a view taken on line 9—9 of Fig. 8 and showing the blank leaving the adhesive applying wheel,

Fig. 10 is a fragmentary plan view of Fig. 9,

Figs. 11–17 illustrate the blank in progressive folded relation as it passes through the machine, and

Fig. 18 is a fragmentary view of the folded blank opened to box form.

In the drawings I have illustrated fragmentary portions of a machine adapted to fold and glue a flat blank 10 (Fig. 11) through the steps illustrated in Figs. 11–17

to the final folded blank 12 (Fig. 17). The blank as thus folded includes an open top end with closure flaps 14 and a closed bottom end 16. When the folded blank is opened into a box 18 (Fig. 18) the folded and glued end 16 automatically forms the box bottom 20. The box illustrated is particularly adapted for use in the sale of popped corn and like products.

A supply 21 of flat blanks 10 is supported in and fed consecutively from a magazine 22 through feed wheels 23 to the inner reaches of a pair of carrier belts 24. The carrier belts convey the blanks continuously through the machine in the direction of the arrow (Fig. 1). Each blank has two symmetrical half sections each carrying flaps 26 and 28 on the advancing end of the blank and which flaps are folded as hereinafter described to form the bottom wall 20 of the box. The machine illustrated and described embodies duplicate mechanisms for folding and gluing these flaps on the two half sections.

Each of said duplicate mechanism comprises a resilient flat leaf spring arm 30 mounted for a limited free rocking movement on a transverse shaft 31. The arm extends forwardly in the direction of movement of the blanks and has a downwardly extending hook 32 on its free end. The arm normally drops by gravity to a position disposing the hook in the path of movement of a flap 26 and as a blank is fed forwardly the hook engages the flap and folds it upwardly and rearwardly about a crease line 34. During this movement a corner 35 of the flap comes into contact with a bar 36 which folds the corner forwardly on a crease line 38.

The bar 36 is mounted on a shaft 39 affixed to the machine frame and is provided with a spiral-like tapering surface 40 for folding the corner onto the flap to the position shown in Fig. 14. Simultaneously therewith the folded flap 26 passes beneath a roller 42 which completes the fold thereto to 180° against the blank to the position illustrated in Figs. 13 and 14. The roller is carried on the bottom end of a rod 43 adjustably supported in a bracket 44 on the frame. The continued forward movement of the blank carries the folded corner 35 beneath a hold down bar 46 supported on shafts 39 and 47. The corner and flap are thus held down during forward movement of the blank to the adhesive applying wheel 48 supported on a shaft 49 and driven by a chain 50.

The glue applying wheel 48 is in longitudinal alignment with the corner fold 35 and the hold down bar 46 ends short of the wheel. When the flap 26 leaves the bar the flap and corner fold spring upwardly (Fig. 6) to such position that the periphery of the wheel contacts the corner and applies adhesive thereto (Figs. 7 and 8). It will be noted that the periphery of the wheel is above and spaced from the blank so that adhesive is applied only to the corner 35 in the area 54. As the blank leaves the wheel an untreated portion of the corner passes beneath a bar 52 which continues to hold the corner and flap in folded position. The blank has now been adhesively treated at 54 as illustrated in Fig. 15.

After leaving the glue wheels 48 the blanks are fed forwardly to mechanism, like the arms 30 and rollers 42 disposed to engage and fold the flaps 28 to the position of Fig. 15. The blanks as thus folded are thereafter continued through the machine and folded as illustrated in Figs. 16 and 17. In Fig. 16 the blank has been folded on the crease line 56 to engage its adhesive 54 with the adjacent flap 28. The folded blank is then passed beneath and in contact with a glue wheel to apply adhesive 57 to the closure flap 58. In Fig. 17 the blank has been folded on the crease line 60 to engage the other flap 28 with the adjacent adhesive 54 and the end of the blank into contact with the adhesive 57. Thus in the final folded blank (Fig. 17) the blank ends have been adhesively secured together and the bottom folds are adjust-

ably secured at 54 so that the folds automatically form the bottom 20 when the blank is opened to the box form of Fig. 18.

The carrier belts 24 operate continuously and feed a continuous stream of blanks through the machine. Each blank in turn contacts the hooks 32 and cooperating mechanism which fold the flaps 26 and corners 35 to the position shown in Fig. 14, and thereafter the corners 35 pass beneath and in contact with the gluing wheel 48 to apply adhesive 54 thereto. All such mechanism operates continuously on the flowing stream of blanks and without the employment of timing mechanism heretofore commonly employed. The advantages resulting from the invention reside in both the extreme simplicity and economy of construction and in the greatly increased productive speed possible with this novel and improved mechanism. Illustrative of the increased speed obtained by a machine employing the invention is the fact that blanks of the type shown in the drawing have been folded at a rate exceeding 30,000 per hour, whereas the top speeds possible by previously known machines employing timing mechanism has been less than half this number of blanks.

Having thus disclosed my invention what I claim as new and desire to secure by Letters Patent is:

1. A continuous and non-synchronized method of folding and applying adhesive to corner portions of flat paperboard blanks each scored along a line providing a marginal flap portion integral with the blank at the line and each flap portion being scored along a second line providing one of said corner portions integral with the flap along such line, which consists in continuously and successively feeding the flat blanks along a predetermined path with said flap portions foremost, folding said flap portions upwardly and rearwardly about the first named line at a predetermined station in said path by resisting at their front margins the forward feeding movement of the blanks, simultaneously therewith folding each corner portion forwardly onto the attached flap about the second named line by resisting said upward and rearward movement of the corner portion with the flap, said folded corner portions normally springing upwardly away from contact with the attached flaps, and applying adhesive to a predetermined area of the top face of each of said forwardly folded corner portions at a subsequent station along said path by continuing said feeding movement of the folded blanks forwardly along the path with the upwardly sprung corner portions disposed beneath and in adhesive applying contact with an adhesively coated surface disposed in spaced relation above said path and the attached flaps at said subsequent station.

2. A machine for folding and applying adhesive to corner portions of flat paperboard blanks each scored along a line providing a marginal flap portion integral with the blank at the line and each flap portion being scored along a second line providing one of said corner portions integral with the flap along such line, comprising a pair of carrier belts having opposed reaches for continuously and successively feeding the flat blanks along a predetermined path with said flap portions foremost, means disposed in said path in position to be engaged by and resist forward feeding movement of the blanks and thereby fold said flap portions upwardly and rearwardly about the first named line at a predetermined station in said path by said resistance against the flaps, a bar disposed over and along a portion of the path at said station and in position to be engaged by and resist said upward and rearward movement of the corner portions simultaneously with said folding of the flap portions and thereby fold each corner portion forwardly onto its attached flap about the second named line, said folded corner portions normally springing upwardly away from contact with the attached flaps, and a non-synchronized rotary applicator wheel having an adhesively coated and continuous peripheral annular surface disposed in spaced relation above said path and said attached flaps at a subsequent station along the path and in position to be engaged by and apply adhesive to a predetermined area of the top face of each of said upwardly sprung folded corner portions as it passes therebeneath during feeding of the blanks forwardly along said path.

3. A continuous and non-synchronized method of folding flap portions of paperboard blanks about fold lines and onto the blanks and applying adhesive to the outer faces of the flaps, which consists in continuously and successively feeding the blanks horizontally along a predetermined path and simultaneously therewith folding said flaps onto the top faces of their attached blanks about said fold lines at a predetermined station in said path, said folded flaps normally springing upwardly away from contact with the attached blanks, and applying adhesive to a predetermined area of the top face of each of said flaps at a subsequent station along said path by continuing said feeding movement of the folded blanks forwardly along the path with the upwardly sprung flaps passing beneath and in adhesive applying contact with an adhesively coated surface disposed in spaced relation above said path and the attached blanks at said subsequent station.

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