March 1, 1932. S. BERGSTEIN 1,847,998

MEANS AND METHOD FOR JOINING MATERIALS TOGETHER OR THE LIKE

Filed Oct. 26, 1929 4 Sheets-Sheet 1

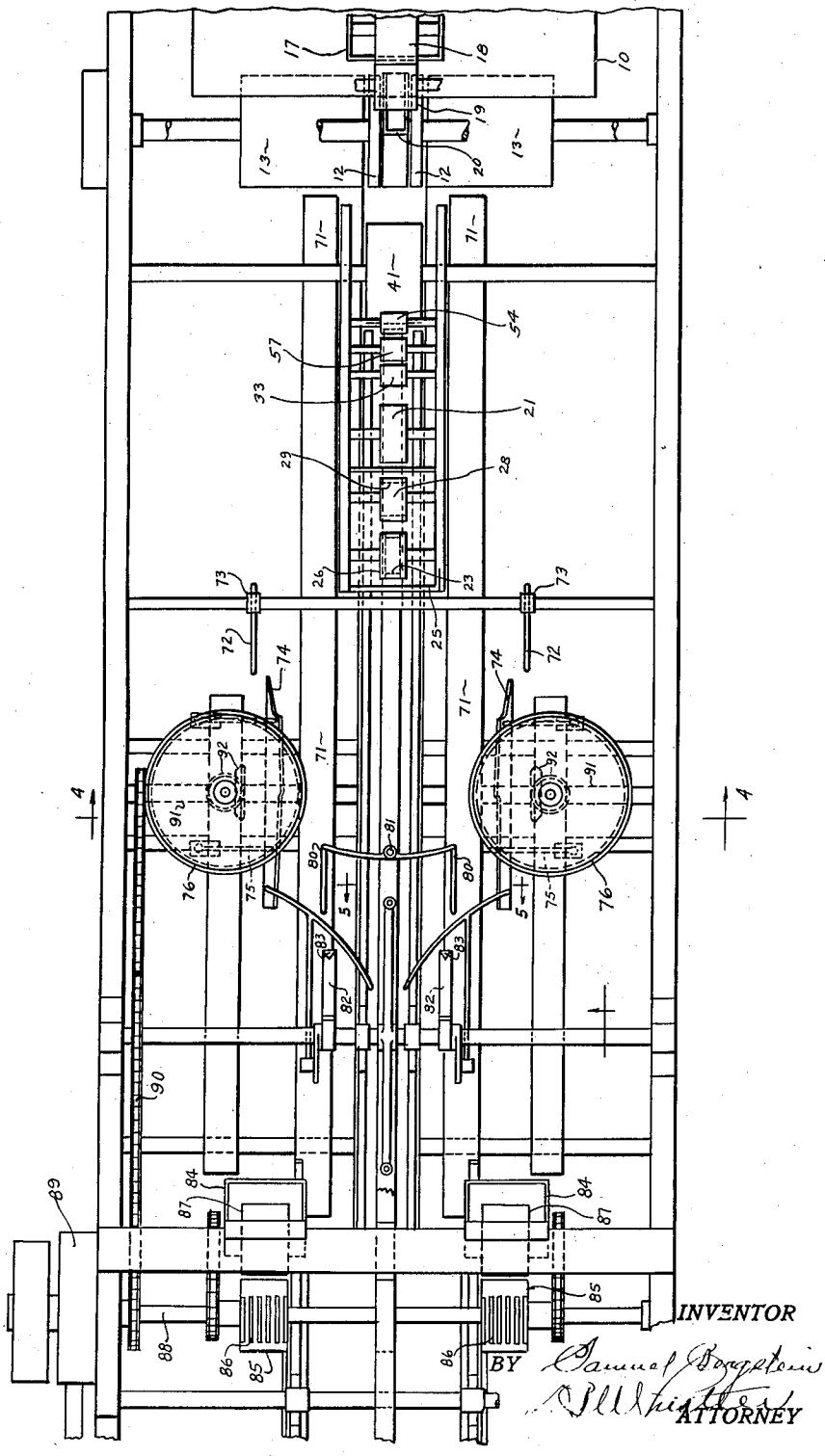


Fig. 1.

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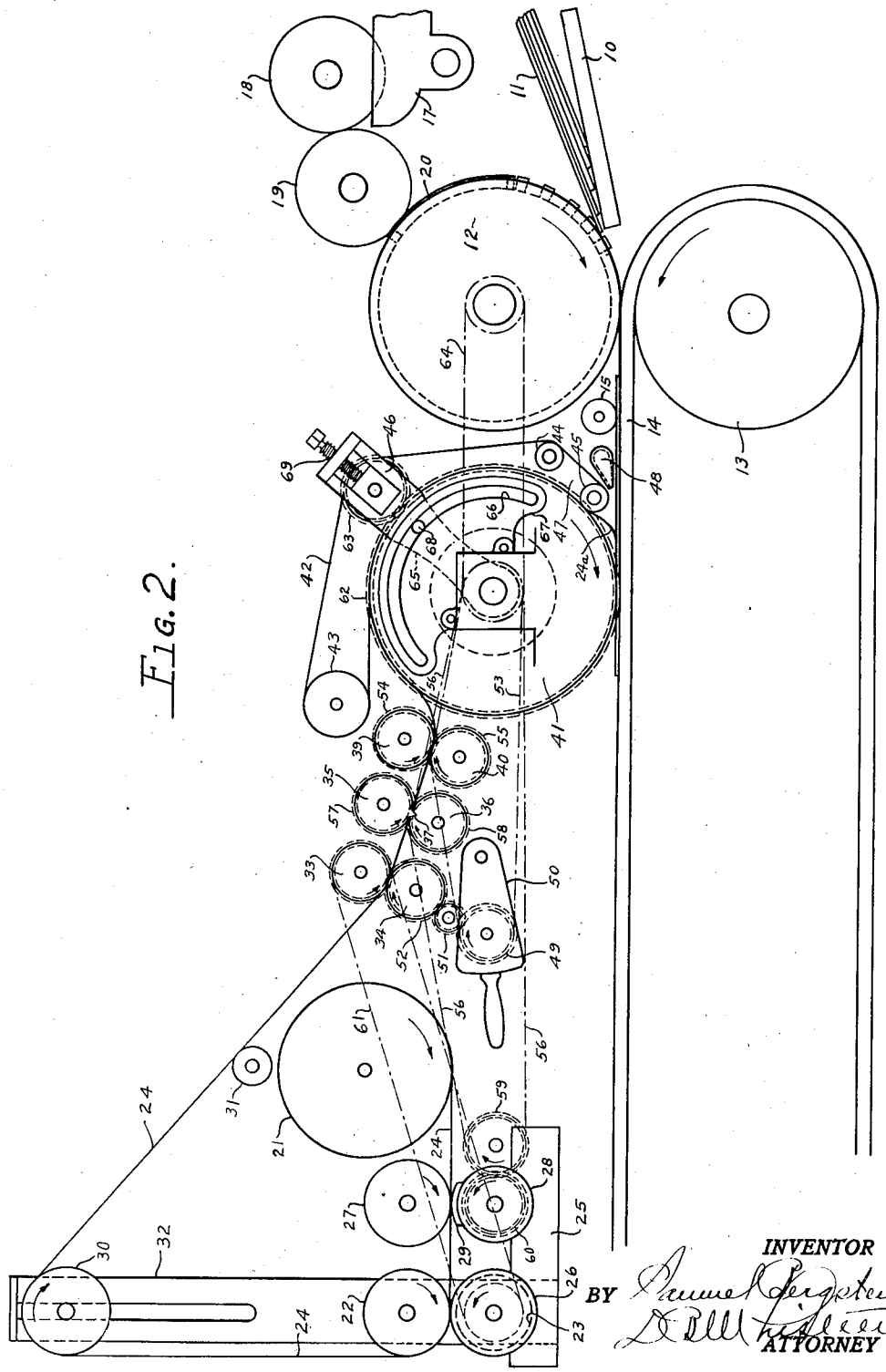


FIG. 2.

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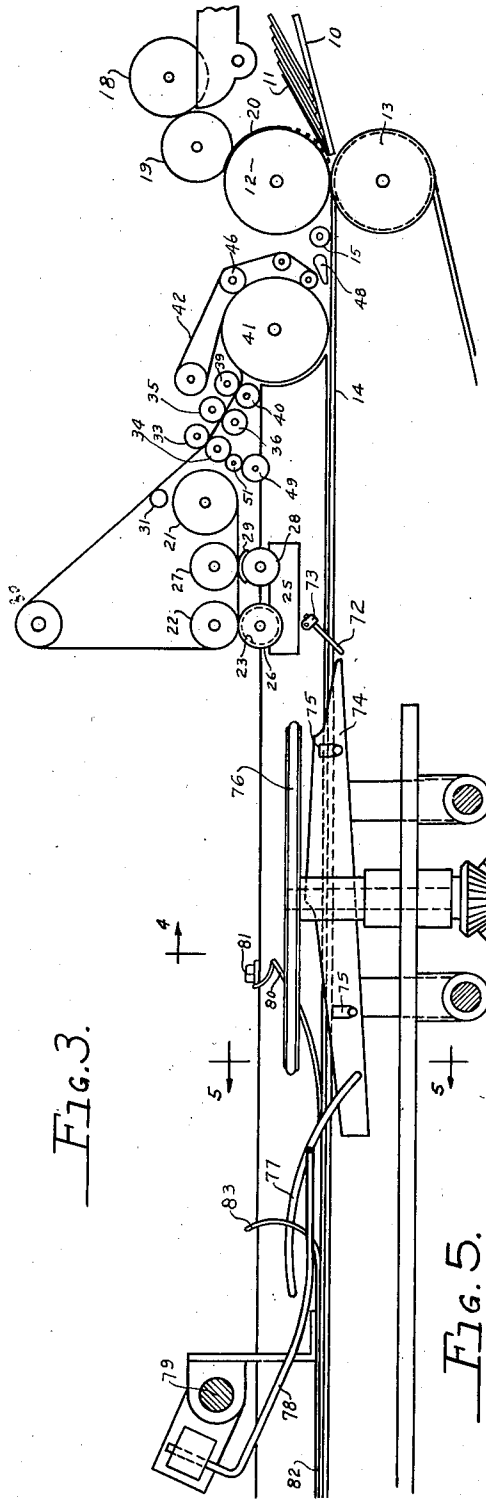


FIG. 3.

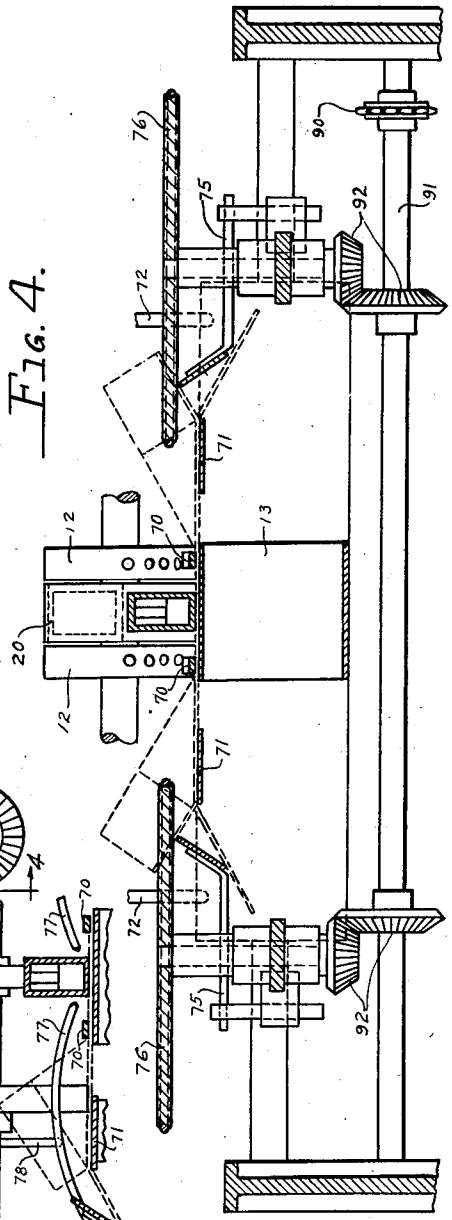


FIG. 4.

FIG. 5.

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MEANS AND METHOD FOR JOINING MATERIALS TOGETHER OR THE LIKE

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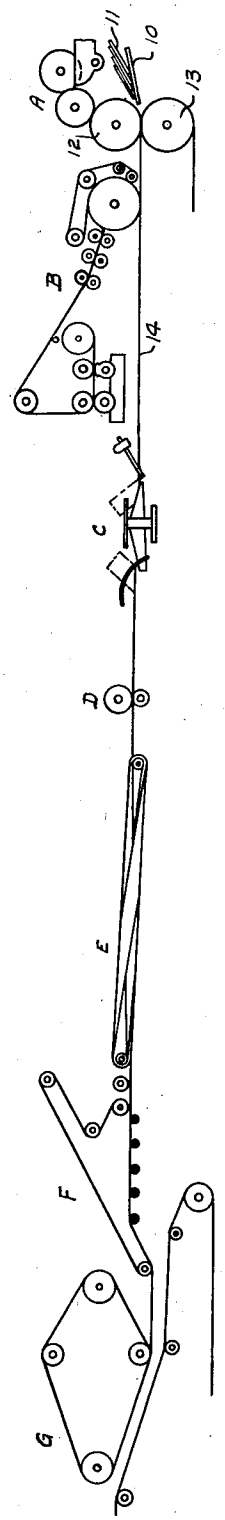


Fig. 6.

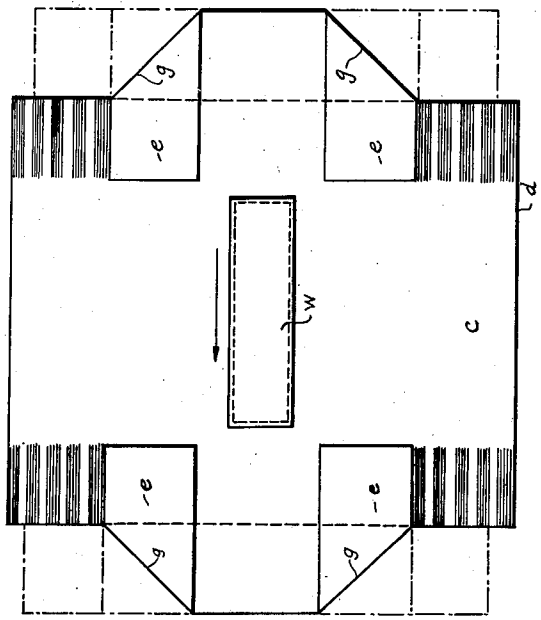


Fig. 7.

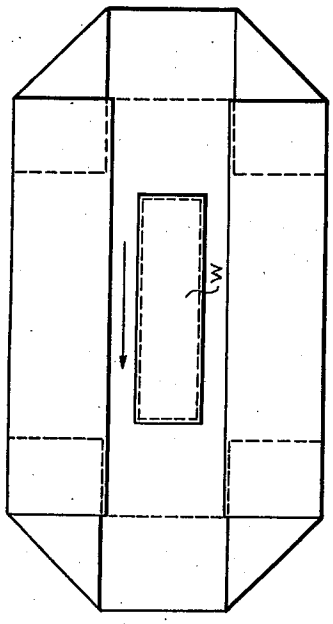


Fig. 8.

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Patented Mar. 1, 1932 1,847,998

UNITED STATES PATENT OFFICE

SAMUEL BERGSTEIN, OF MIDDLETOWN, OHIO, ASSIGNOR TO THE INTERSTATE FOLDING BOX COMPANY, OF MIDDLETOWN, OHIO

MEANS AND METHOD FOR JOINING MATERIALS TOGETHER OR THE LIKE

Application filed October 26, 1929. Serial No. 402,590.

This invention relates to improvements in means and methods for making paper containers, such as boxes, bags, envelopes, etc.

The improvements as herein illustrated and described are a development of the inventions set forth in my copending applications for patents Serial No. 282,020, filed May 31, 1928; Serial No. 353,128, filed April 6, 1929, and Serial No. 355,038, filed April 15, 1929.

The objects attained in the invention consist in improved means for joining material, which has been treated with a substance for making it transparent, to paper sheets or blanks for producing containers commonly known as window boxes, bags, envelopes, etc., the transparent material being applied over openings in the containers for forming the windows through which the contents may be observed.

The improved means and method herein set forth for producing such articles consists in a machine which is organized for large production and which joins the two materials together before the articles are formed, the movement of the materials on the machine being in timed relation one with the other for effecting close registration of the transparent material with the window openings, both materials moving without pause to the completion of the articles.

A common difficulty experienced with transparent material of this character, in its various commercial forms, arises from the tendency of the material to curl or crinkle when liquid adhesive is applied to the edges. This acts to wrinkle the face of the material and to distort the adjoining edges of the paper to which it is joined which results in an unsatisfactory product. To minimize this difficulty heavier transparent materials are generally used than would otherwise be required.

More recently moisture proof transparent material has been produced as a commercial product. The invention herein set forth for making window containers includes treating the joining edges of moisture proofed material with a solution for removing or neutralizing the moisture proof element before the adhesive is applied for joining the transparent and paper materials together. Otherwise the moisture proof element acts to prevent the normal action of the adhesive for forming the joints.

The invention as herein set forth contemplates the production of complete window containers of the character indicated; also the preparation of the transparent material as stock for subsequent manufacturing. Means are provided for quick drying of the solution applied for neutralizing the water proofing element before the transparent material is reduced to the required lengths.

For very light transparent material, which is very flexible and tends to curl at cut ends, means may be provided, such as means for directing an air current against the material, as herein set forth, to prevent curling of the end until the juncture is made with the paper.

In the accompanying drawings which serve for illustrating the invention in a preferred machine for making window boxes;

Fig. 1 is a plan view of the machine, portions which are common and were known in the art being omitted in the illustration;

Fig. 2 is a view in side elevation of the front end of the machine as shown in Fig. 1, consisting of the mechanism for joining the materials together, portions of the mechanism being illustrated in conventional outline;

Fig. 3 is a view in side elevation similar to Fig. 2, including the first unit of the box folding mechanism;

Fig. 4 is a sectional view on line 4—4 of Fig. 3;

Fig. 5 is a detail sectional view on line 5—5 of Fig. 3;

Fig. 6 is a view in outline in side elevation of the complete machine.

Figs. 7–8 are views of the box illustrating the steps of forming it.

In the invention as shown in the drawings the mechanism for joining the materials is combined with a machine for making paper boxes, being substantially the same as that set forth in my copending application for patent Serial No. 353,128, filed April 6, 1929.

As shown in outline in Fig. 6 of the drawings,—A represents the feeding mechanism

for the box blanks, including means for applying adhesive around the edges of the windows for joining the transparent material to the blanks before the boxes are formed;—B represents the mechanism for measuring the transparent material and moving it to the box blanks, including means for neutralizing the portions of the moisture proof element that register with the adhesive on the blanks for making the action of the adhesive effective;—C represents the means for effecting the initial folds on the box blanks;—D means for applying adhesive to the blanks for joining the box together;—E—F for effecting the final folds of the box; and—G means for stacking the boxes as delivered knocked down from the machine.

The feeding mechanism—A includes a table 1—for supporting a stack of box blanks 11 which are cut and scored ready for folding, including cutting of the window openings—W. Opposite feed rolls 12 act to deliver the box blanks singly to a carrier belt 14 which traverses a roll 13, in feeding relation with rolls 12, and acts to move the blanks into position to receive the transparent material. A pressure roll 15 acts to prevent slipping of the box blanks on the carrier belt and thus to effect movement of the blanks in timed relation to mechanism—B.

Operably associated with feed rolls 12 are means for applying adhesive to the edges of the window openings in the box blanks, consisting of a container 17 for liquid adhesive, rolls 18—19 for conducting the adhesive to a matrix 20 supported between rolls 12 which act to transfer the adhesive along the edges of the window openings.

The means—B for delivering the transparent material to the box blanks include a material supply roll 21, feed rolls 22—23 for drawing the web of material 24 off the roll, rolls 23 having peripheral portions operable in a container 25 of a solution for neutralizing the moisture proof element on the transparent material, the solution being applied on the opposite side edges of the material by the rolls 23 as the web is moved along.

Between the supply roll 21 and rolls 22—23 are rolls 27—28, roll 28 also being operable in the container 25 and carrying a suitable pad 29 for applying the neutralizing solution to equally spaced transverse portions of web 24. As the web in the machine illustrated is to be applied as a window, it will be obvious that the solution must be applied to both the side and end edges of each piece to be used as a window.

Any suitable solution, preferably one having an alcoholic content, may be used for neutralizing or removing the moisture proof element on the transparent material. Application of the solution to the material requires that the effected portions be dried before the material is delivered to the box blanks. For this purpose the material is conducted from feed rolls 22—23 over a drier comprising rolls 30—31, roll 30 being adjustable in a frame 32 for regulating the drying time as may be required.

From the drier the material passes to feed rolls 33—34, thence to rolls 35—36 provided with perforators 37, which act to divide the web into measured lengths by perforating the material transverse of the web at regular intervals.

From the perforating rolls the web passes through feed rolls 39—40, thence to a transfer roll 41 which delivers the measured lengths of material to the box blanks, the delivery being timed so that the neutralized edges of each length of material are brought into register with the adhesive coated edges of the window openings in the box blanks.

Coacting with the transfer roll 41 is a belt 42 operable over rolls 43—44—45 and traversing a portion of the transfer roll, a pinch roll 46 acting to press the belt against the roll. The speed of belt 42 and the peripheral speed of the transfer roll are equal one with the other and greater than the speed at which the web of transfer material moves. The advancing end of the web slips more or less between the belt and the transfer roll until it moves under roll 46 which acts to pinch the end of the web between the belt and the transfer roll, which exerts a strain on the web and results in tearing off the end at the first perforating line.

The severed slips of transfer material are moved frictionally between the transfer roll and belt 42 to the end of the lower loop 47 of the belt, where the forward end of each slip 24*a* moves into engagement with the box blank which is in position to receive it, the edges of the slip being in register with the edges of the window openings. The materials are joined together adhesively as the blanks move under the transfer roll.

For very thin transparent material, which tends to curl at the cut ends, means such as the device 48, shown conventionally in Fig. 2, may be employed for blowing a current of air against the material for preventing curling of the end until it comes in contact with the adhesive on the paper blank.

Means are provided for varying the lengths of the transparent slips according to the size of the window openings, consisting of an interchangeable gear 49 supported on a pivoted bracket 50 and driving lower feed roll 34 through gears 51—52; gear 49 being operably connected to transfer roll 41 by a chain drive 53 which also drives rolls 39—40 through gears 54—55. A chain drive 56 connects the roll 28 and perforating rolls 35—36 also to the transfer roll, the perforating rolls are geared together by gears 57—58, the connection to roll 28 is through gears 59—60.

Feed roll 23 is driven from feed roll 33

by a chain drive 61; belt 42 and pinch roll 46 through gears 62—63, and the transfer roll 41 through a chain drive 64 which connects it to feed roll 12.

Means are provided for adjusting the pinch roll 46 according to the length of the transparent slips which is determined by the length controlling gear 49. For this purpose the pinch roll is supported on a pivotally adjustable bracket 65, extended outward from the shaft of the transfer roll 41, a slot 66 in an adjacent disc 67 and a belt 68 in arm 65 serving to hold the arm as adjusted. A device 69 serves to regulate the tension between belt 42, pinch roll 46 and transfer roll 41.

It will be apparent from the foregoing detailed description that the length of the transparent slips can be closely regulated to the size of the window openings and that the feeding mechanism for the box blanks is coordinated with the feeding mechanism for the transfer material so that the transparent slips are brought properly into register with the window openings as the materials are brought together.

As the box blanks pass from mechanism —B they pass along parallel guides 70—71, the extended portions —*d* of the ends *c*—*d* of the blanks (see Fig. 7) being engaged by opposite fingers 72 supported in brackets 73, which deflect flaps *c*—*d* slightly below the plane of movement of the blanks, and cause the flaps to pass under the opposite members 74, supported on inwardly extended brackets 75. As the blanks advance the forward sealing flaps —*e* are engaged by the tapered forward ends of members 74 which are inclined upward and inward, as illustrated in Figs. 1 and 3, and their upper edges shaped to turn the flaps upward at an angle on score lines —*g*, substantially beyond 90°. As the blanks move along members 74 the forward flaps —*e* are further acted on by opposite rotatable folders 76 and opposite folding members 77 supported on brackets 78 on a fixed shaft 79, which complete the fold of the flaps substantially flat over the face of the blanks.

The rear sealing flaps —*e* are folded in like manner, the flaps being turned up to generally vertical position in the first part of the folding action by members 74 the final folding being effected by the opposite rotatable folders 76, the fold being inverse to the fold of the front flaps —*e*, both folds being substantially parallel to the direction of movement of the box blanks on the machine.

As the blanks are moved out of engagement of folders 76, the rear folded flaps —*e* are engaged by opposite fixed arms 80, supported at 81, which act to hold the flaps down on the face of the blanks as they move under opposite longitudinal guides 82 the forward ends 83 of which are curved upward for causing the folded blanks to pass readily under the guides to the gluing mechanism —D which acts to apply glue to the opposite, laterally extended flaps —*c*.

The gluing mechanism is of a common type, generally well known in this art. As here shown the mechanism consists of the opposite glue containers 84, glue applying rolls 85 which are provided with adjustable glue pads 86, and a glue transfer roller 87 for conducting the glue from the container to the glue pads, the glue rollers being supported on a shaft 88 driven by a power pulley 89.

The folders 76 are driven at constant high speed from shaft 88 through a chain drive 90, shaft 91 and gears 92. The box blanks are delivered to the gluing mechanism in the required sequence for effecting application of the glue to predetermined, or prescribed portions of the sealing flaps as indicated by the shaded portions on flaps —*e* in Fig. 7. To this end the contact portions 86 of glue roll are segmental and adjustable on the rolls, and apply glue only to the portions of its surfaces of the box blanks which form the glue joint, the contact surfaces being preferably serrated, as indicated, for making line contacts with the sealing flaps, thus providing for the glue to spread between the lines as the sealing pressure is applied, which results more uniform and firmer sealing of the joints.

As the box blanks pass from the gluing mechanism they are moved into engagement with opposite belts E which are arranged in the usual diagonal relation, in machines of this character, for folding the intermediate sealing flaps —*c* over the end sealing flaps —*e* which results in joining the flaps adhesively together, the boxes being knocked down are firmly formed by pressure sealing mechanism —F as they pass to the stacking mechanism —G.

I claim as my invention:

1. A method for joining sheet materials together, one material being moisture proofed, consisting in applying adhesive to portions of one material, in neutralizing portions of the moisture proof element and in moving said portions progressively into register one with the other for effecting adhesion between the materials.

2. A method for joining sheet materials together, one material being moisture proofed, consisting in applying adhesive to portions of the other material, in neutralizing portions of the moisture proof element, in separating the moisture proof material into measured lengths and in moving said lengths progressively into register with said portions of the other material for effecting adhesion between the materials.

3. A method for joining materials together, one of the materials being moisture proofed, consisting in neutralizing portions of the moisture proof element and in applying adhe-

sive to portions of the other material in continuous movements of both materials to superposed relation one with the other for effecting adhesion between the materials.

4. A method for joining materials together, one of the materials being moisture proofed, consisting in neutralizing portions of the moisture proof element, and in applying adhesive between said neutralized portions of one material and the other material for effecting adhesion between the materials.

5. Means for joining materials together one of the materials being moisture proofed, comprising means for rendering portions of the non-moisture proof material adhesive, means for applying a solution to the moisture proofed material for neutralizing portions of the moisture proof element, means for causing the solution to dry, means for severing the sheet into measured lengths, and for moving said lengths into register with the other material for effecting adhesion between the materials.

6. Means for joining materials together, one of the materials being moisture proofed, including means for moving the materials into superposed relation one with the other, comprising means for rendering portions of the non-moisture proof material adhesive, means for applying a neutralizing solution to portions of the moisture proof element and for measuring and severing single lengths thereof, and means to effect registration between the neutralized portions of each length and the adhesive on said other material for causing adhesion between the materials.

7. Means for joining materials together, one of the materials being moisture proofed, including means for moving the materials into superposed relation one with the other, comprising means for rendering portions of the non-moisture proof material adhesive, means for applying a solution to the moisture proofed material for neutralizing portions of the moisture proofed element, means for causing the solution to dry, means acting to partially sever measured lengths of the moisture proofed material and subsequently to completely sever said lengths and to effect registration thereof with the other material for causing adhesion therebetween.

8. Means for joining sheet materials together, including, means for applying adhesive to portions of divided lengths of one material and for moving the material along without pause, means for moving a sheet of moisture proofed material along without pause and means for applying a neutralizing solution to portions of the moisture proof element, means operably timed with said means for moving the materials acting to sever said sheet into measured lengths having their sides and lateral edges neutralized, and means acting to effect registration of said edges of each length with a length of the other material to cause adhesion between the materials.

9. Means for treating moisture proofed material, including means for moving the material along, and means operably connected with said moving means for applying a neutralizing solution to portions of the moisture proof material.

10. Means for treating moisture proofed sheet material, including means for moving the sheet along, means operably connected with said moving means for applying a neutralizing solution to portions of the moisture proof element, and means for further moving the sheet to permit the material to dry.

11. Means for joining materials together, including means for moving the materials into superposed relation one with the other, and means for directing a current of air against an advancing end of one of the materials for sustaining the same as the materials are brought together.

12. Means for joining materials together, one of the materials being a moisture proofed sheet, comprising means for moving the materials into superposed relation one with the other, including means for rendering portions of the non-moisture proof material adhesive, means for applying a neutralizing solution to portions of the moisture proof element, means adjustable for separating said sheet into variable lengths according to the distribution of the adhesive on the other material, said portions of the material being brought into register one with the other in said relation of the materials for effecting adhesion therebetween.

13. Means for joining materials together, one of the materials being a moisture proofed sheet, the other material having adhesive applied thereto, including operably associated means for moving the materials into superposed relation one with the other, for applying neutralizing means to portions of the moisture proof element extended transversely of the sheet, for separating the sheet into single lengths intermediate the lateral edges of said neutralized portions, and for effecting registration of said portions with the adhesive on said other material to cause adhesion between the materials.

14. Means for separating web material into measured lengths, including means for advancing the web, means operably connected with the web advancing means for perforating the web transversely at spaced intervals, a feed roll for delivering a measured length of the web into said relation with the other material and operable at higher peripheral speed than the web, a pinch roll coacting with the feed roll for engaging and separating the advancing sheet on the perforation line nearest the advancing end thereof.

15. Means for separating web material into measured lengths, including means for advancing the web, means operably connected with the web advancing means for perforating the web transversely at spaced intervals, a feed roll for delivering a measured length of the web into said relation with the other material and operable at higher peripheral speed than the web, a belt traversing the feed roll, and a pinch roll coacting with said belt and feed roll for separating the sheet on a perforation line.

16. Means for moving web material into superposed relation with another material, including means for advancing the web, means operably connected with the web advancing means for perforating the web into measured lengths, a feed roll for delivering said lengths of material into said relation with the other material, and operable at higher speed than the web, a belt traversing the feed roll and coacting therewith for advancing the web thereover, a pinch roll coacting with said belt and the feed roll for separating the web on a perforation line, and means for directing a current of air against the separated material for preventing curling thereof as the same passes from said belt and the feed roll into engagement with the other material.

In testimony whereof, I affix my signature.

SAMUEL BERGSTEIN.