Feb. 21, 1928. 1,660,185

S. BERGSTEIN

MEANS AND METHOD FOR MAKING AND SEALING PAPER BOXES AND THE LIKE

Filed July 10, 1925 3 Sheets-Sheet 1

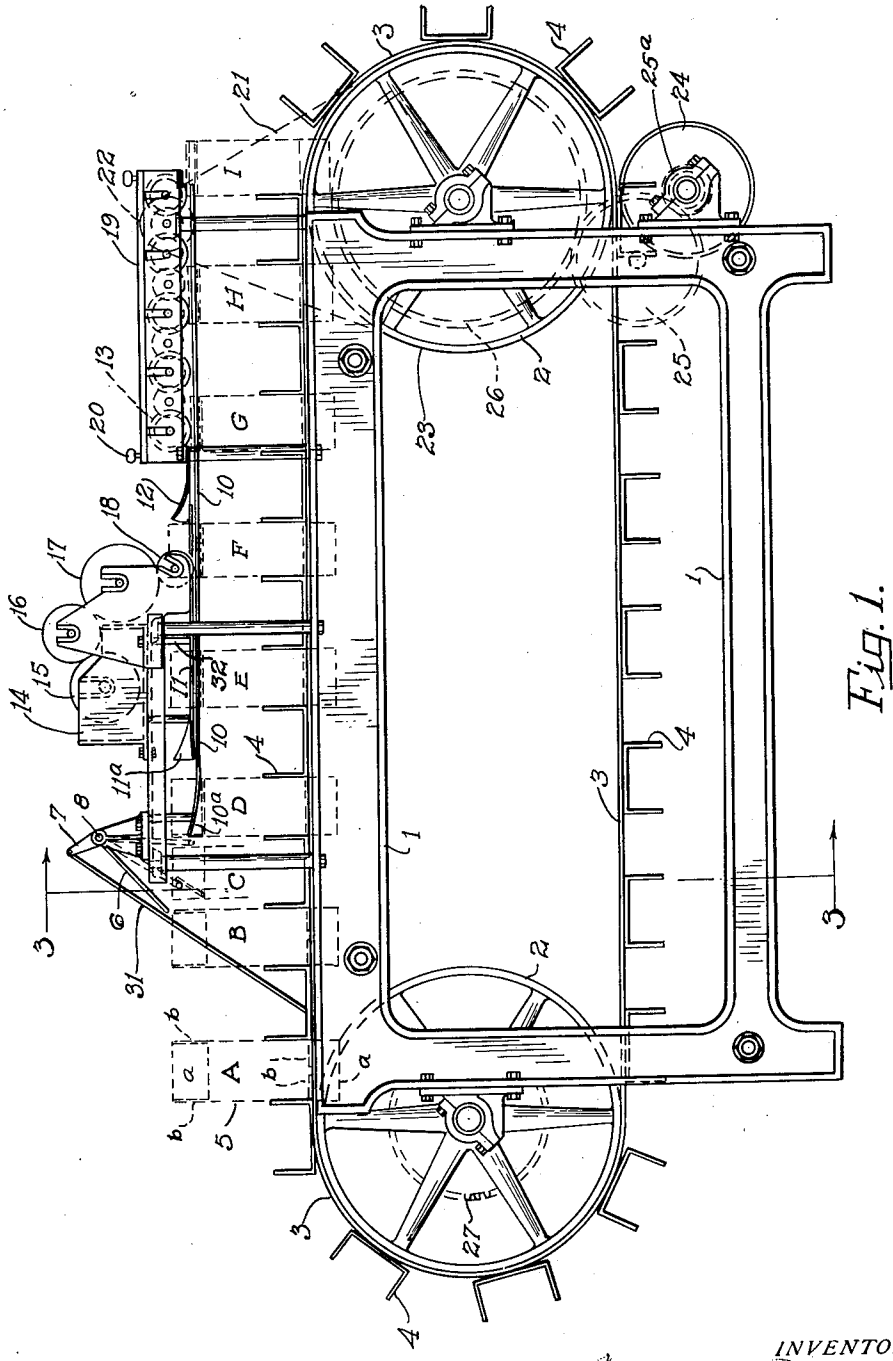

Fig. 1.

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Filed July 10, 1925 3 Sheets-Sheet 2

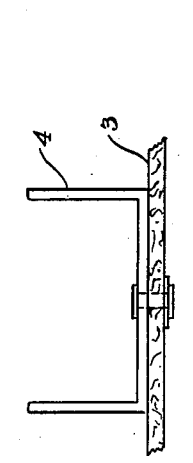


Fig. 6.

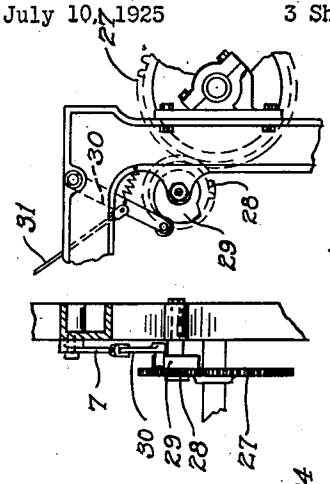


Fig. 4.

Fig. 5.

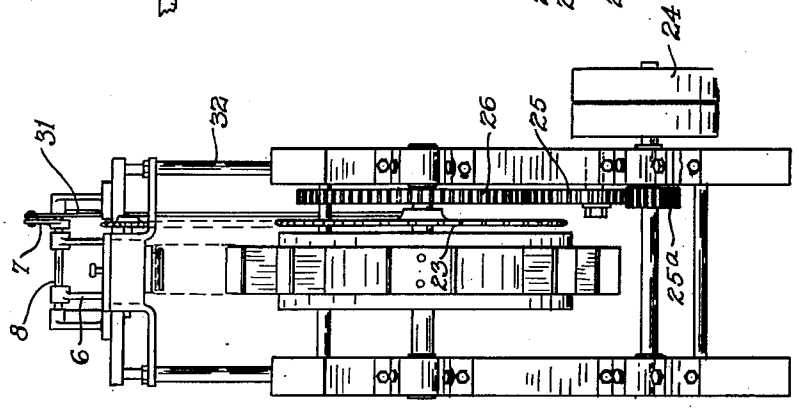


Fig. 2.

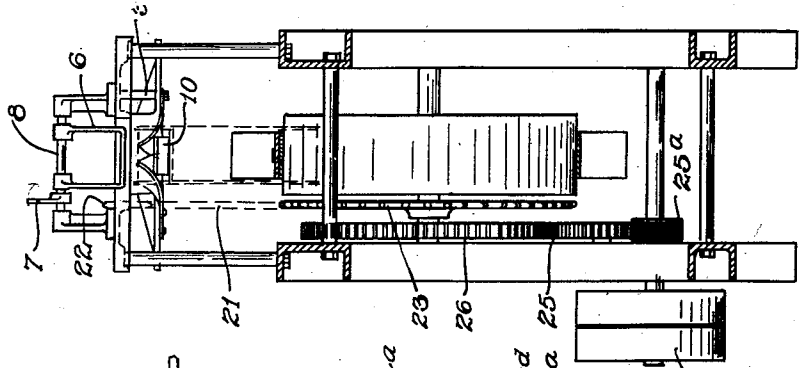


Fig. 3.

Fig. 13.

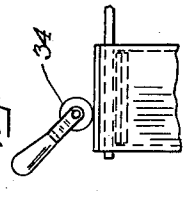


Fig. 14.

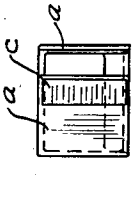


Fig. 15.

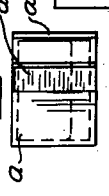
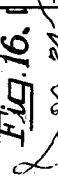


Fig. 16.



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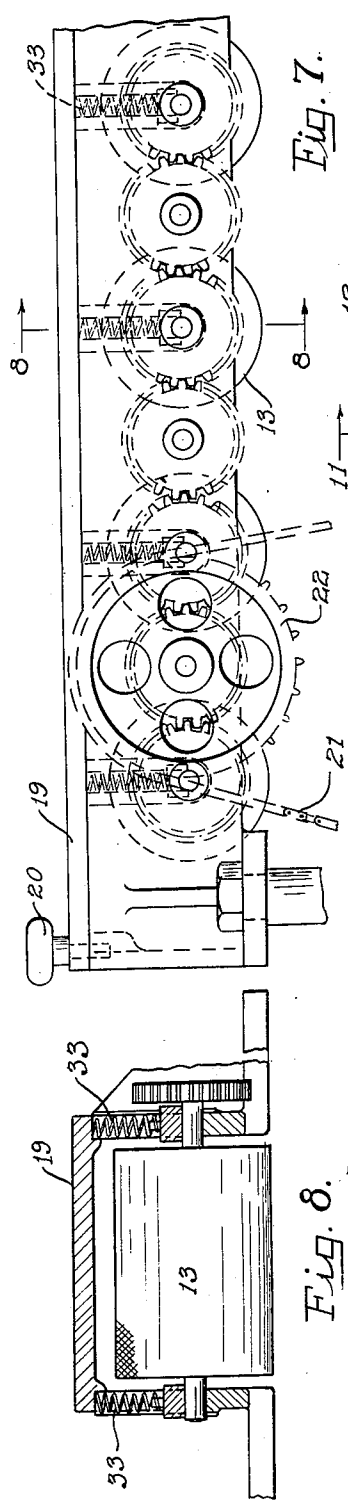

Fig. 7.

Fig. 8.

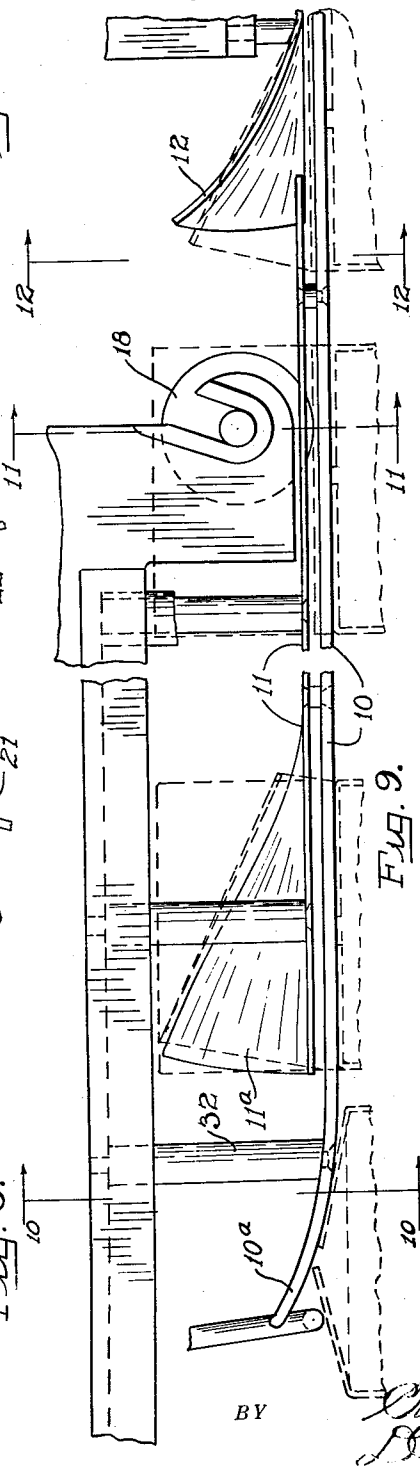

Fig. 9.

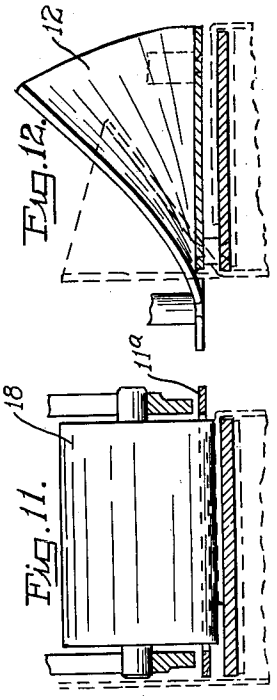

Fig. 12.

Fig. 11.

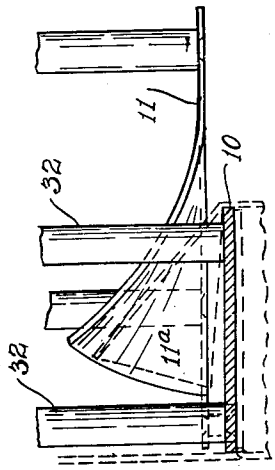

Fig. 10.

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Patented Feb. 21, 1928. 1,660,185

UNITED STATES PATENT OFFICE.

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

MEANS AND METHOD FOR MAKING AND SEALING PAPER BOXES AND THE LIKE.

Application filed July 10, 1925. Serial No. 42,671.

This invention relates to improved means and method for making and sealing paper boxes.

The main object attained by the invention is a simple means and method whereby users of boxes are enabled to form, or partially form, their boxes as required from stock box blanks furnished by the manufacturer.

A feature of the invention consists in a form of construction and method of forming the box joints, at the ends or sides, whereby a very substantial saving of material is effected and, at the same time, a box of better construction is produced at lower cost of time and labor.

A highly important feature of box construction relates to the forming of the joints, having particular reference to adhesive joints which are used exclusively on boxes for certain products, as all boxed food products which require protection against atmospheric deterioration. My invention relates more especially to means and methods for making glued joints that meet every commercial requirement in sealed, or partially sealed, boxes and which, as above stated, tend to cheapen the product both with respect to quantity of material used and general production costs.

My invention lends itself readily in suitable forms to either hand or machine operations, thus it is adapted in its commercial practice to both small and large users of paper boxes, the construction of the boxes by either method of production being of first quality.

In the accompanying drawings, both hand and machine methods of production are illustrated to represent the practice of the invention, the same being described comprehensively in the detailed specification and defined patentably in the appended claims.

In the drawings:

Fig. 1 is a side elevation of a machine in one form for practicing my invention;

Fig. 2 is a plan view of the machine;

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

Figs. 4 and 5 are detail views of one of the folding mechanisms;

Fig. 6 is a detail of the box carrier;

Fig. 7 is a detail of pressure rollers for sealing the joints;

Fig. 8 is a sectional view taken on line 8—8 of Fig. 7;

Fig. 9 is a detail of the second and third folding devices;

Fig. 10 is a sectional view taken on line 10—10 of Fig. 9;

Figs. 11 and 12 are sectional views taken on lines 11—11 and 12—12 of Fig. 9;

Fig. 13 is a detail in cross section of end of box;

Fig. 14 is a detail view illustrating hand method of practicing the invention;

Fig. 15 is a detail illustrating method of applying adhesive to the box;

Fig. 16 is a detail illustrating modified method of applying the adhesive.

As here shown, the box making machine, or more correctly designated the box sealing machine, consists of a suitable frame structure 1, in which opposite endless carrier operating drums 2 are supported, one of the drums being adapted to be driven by any suitable means, as a power pulley 24 and and gears 25—26—25a. An endless carrier 3 made of leather or fabric belting or any suitable material, traverses drums 2 at a speed suitable to the production requirements of the machine. Box spacing members 4, rectangular-shaped as here shown, are arranged at regularly spaced intervals on carrier belt 3, the space between the members being of the required dimension to receive a box 5 between opposite members 4, as indicated in positions A to I, Fig. 1, and to support the same in an upright position by frictional contact therewith, the upper end of the box, as the same is positioned on the carrier, remaining open with the end flaps *a*—*b* extended upwardly, the lower end of the box being seated on the carrier with the tuck-in flaps —*b* folded inwardly and flaps —*a* depending over the opposite edges of the carrier.

As the boxes are advanced on carrier 3 to the position indicated at C, the upper rear tuck-in flap —*b* is acted upon by a reciprocating arm 6 and is folded inwardly as indicated. Arm 6 is operated from a gear 27 secured on the shaft of the carrier drum 2, an intermediate gear 28 meshing with gear 27, a cam 29 secured on the shaft of gear 28 and coacting with the free end of a pivoted arm 30 which is connected to shaft 8, to which arm 6 is secured, by a rod 31 and an arm 7.

When the boxes are in position C, as indicated in Fig. 1, the forward tuck-in flap —*b* will have passed under the up-turned end

10^a of a guide and pressure sealing plate 10, rear flap —*b* being in position also, as it passes from the influence of arm 6 thereon, to immediately pass under end 10^a, the opposite flaps —*a* remaining extended on opposite sides of the plate. The plate 10 is supported by means of rods 32 depending from the frame of the machine, the rear portion of the plate being unsupported.

In position D of the boxes, both tuck-in flaps —*b* will have been folded by the action of plate 10 thereon substantially at right angles to the sides of the box and will be in free contact with the under side of the plate to the delivery of the sealed box from position I.

In position E, one of the end flaps —*a* will have passed under the upwardly curved end 11^a of a guide and folding plate 11 which acts to turn the flap inwardly over plate 10, the fold being made at a right angle as the box is moved to position E, the flap being wider than plate 11, the inner edge of the same will be beyond the inner edge of the plate in the plane of an adhesive applying roller 18 which acts to apply a coat of adhesive to the exposed portion of the flap.

The opposite end flap —*a* remains extended until the box is moved to position F, the same being then folded over the first folded flap —*a* by engaging an upwardly curved guide 12 arranged along the carrier on the side opposite plate 11, the boxes being then moved through position G, H and I under the action of a series of pressure rollers 13, flaps —*a* which are thus glued together being supported on their under side by plate 10 with the result that firm adhesive between the flaps is effected.

The adhesive applying mechanism comprises a liquid adhesive container 14 and a series of distributing rollers 15—16—17 and 18 of any suitable character as well known in devices of this character. The rollers may be gear entrained one with another, if desired, for a positive driving action or may be operated as here shown through frictional contact of roller 18 with the ends of the paper boxes.

The sealing or pressure rollers 13, as here shown, are supported in an adjustable frame 19 and are geared one with another as indicated at 19—20 in Fig. 7, the frame being provided with spring tension elements 33, suitable adjusting means, as the adjusting screw devices 20, for regulating the pressure under which the glued joints are formed,—the periphery of the rollers being knurled, preferably, to effect an intermeshing of the paper one part with another to render the adhesion more effective. The pressure rollers operate at the same peripheral speed as the box carrier 3, thus the ends of the boxes move evenly under the pressure rollers. The pressure rollers are actuated by means of a chain and sprocket 21—22—23 connection with the rear endless carrier driver 2.

The character of the joint formed is illustrated in detail Fig. 13. It will be observed that the end flaps —*a* overlap one another at the joint only a limited extent, the overlapping portions being the minimum required for an effective joint, and made possible only by use of means, as the supporting plate 10 and pressure rollers 13, for forming the joints under relatively high pressure. The economy effected in the manufacture of certain common types of paper boxes used in enormous quantities, by this saving of raw material, is from 20% to 25%, which is more than the normal margin of profit at which boxes of this character can be made, thus the invention is instrumental in cheapening without diminishing the quality of the product.

The hand method of practicing the invention is illustrated in Fig. 14. The arrangement consists of a projected plate 10^b, supported in any suitable manner and adapted to have the partially folded ends of the box brought to the under side of the plate, the sealing flaps —*a*, having been previously gummed and moistened, being then folded over plate 10^b, the edge of one flap overlapping the other, and pressure applied by any suitable means, as the hand pressure roller 34, to seal the joint.

It will be understood that boxes which are to be sealed at both ends, boxes that have been supplied with their contents, will be run through the machine a second time with the ends of the boxes reversed.

In Figs. 15 and 16, two ends of boxes, adapted to be sealed on the improved machine, are shown to illustrate optional methods, in practicing the invention, of applying the adhesive element for sealing the boxes. As illustrated in Fig. 15, the adhesive is applied to the strip —*c* of end flap —*a* on the machine as herein described, the method illustrated in Fig. 16 consisting in applying a strip —*d* of double-gummed tape to one of the end flaps —*a* on the paper blank for making the box before the same is formed into a box. In the latter method, the devices 14 to 18 act merely to moisten the exposed surface of the tape, all other operations of machine production being the same as herein described.

Having described my invention, I claim:

1. A box making machine comprising means for moving boxes progressively with sealing flaps extended, a sealing flap supporting member extended along the course of the boxes in close proximity to and disposed over the open ends thereof, means acting to fold opposite sealing flaps to move under said member and other opposite sealing flaps to move over said member, means acting to render the flaps folded over and supported

by said member adhesive, and pressure means coacting with said member for effecting sealing of the boxes.

2. A box making machine comprising means for moving boxes progressively with sealing flaps extended, a sealing flap supporting member extended along the course of the boxes in close proximity to and disposed over the boxes, means acting to fold the sealing flaps over said member and for rendering the same adhesive, and pressure means coacting with said member for effecting sealing of the boxes.

3. A box making machine comprising means for moving boxes progressively with sealing flaps extended, means acting to effect a fold of opposite sealing flaps, an extended plate supported along the path of the boxes disposed over the folded flaps between extended flaps, means acting to fold the last named flaps over said plate, means acting to apply adhesive to the flaps folded over and supported by said plate, and pressure elements coacting with said plate on said flaps for effecting sealing of the boxes.

In testimony whereby, I affix my signature.

SAMUEL BERGSTEIN.