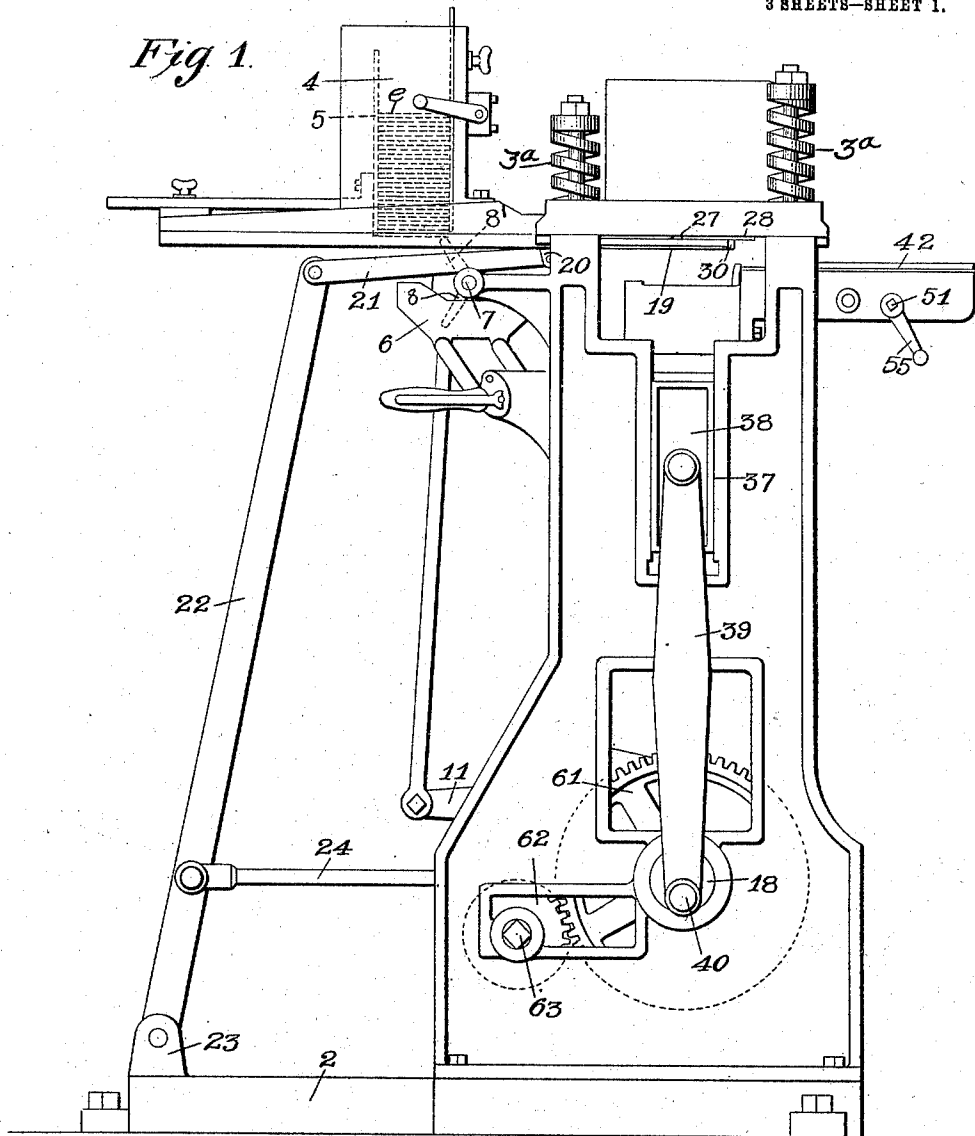


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 PIECING MACHINE FOR PAPER BOX BLANKS.
 APPLICATION FILED JUNE 29, 1903.

966,834.

Patented Aug. 9, 1910.

3 SHEETS—SHEET 1.



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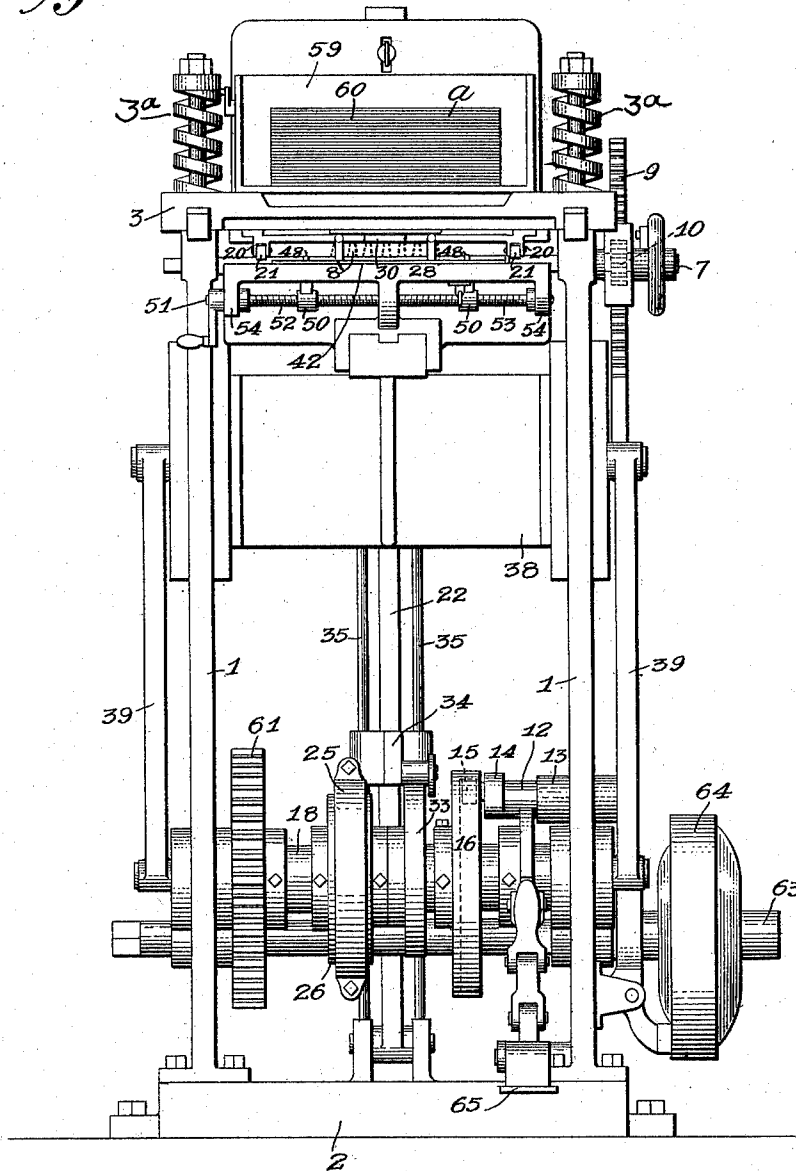
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Fig 2.



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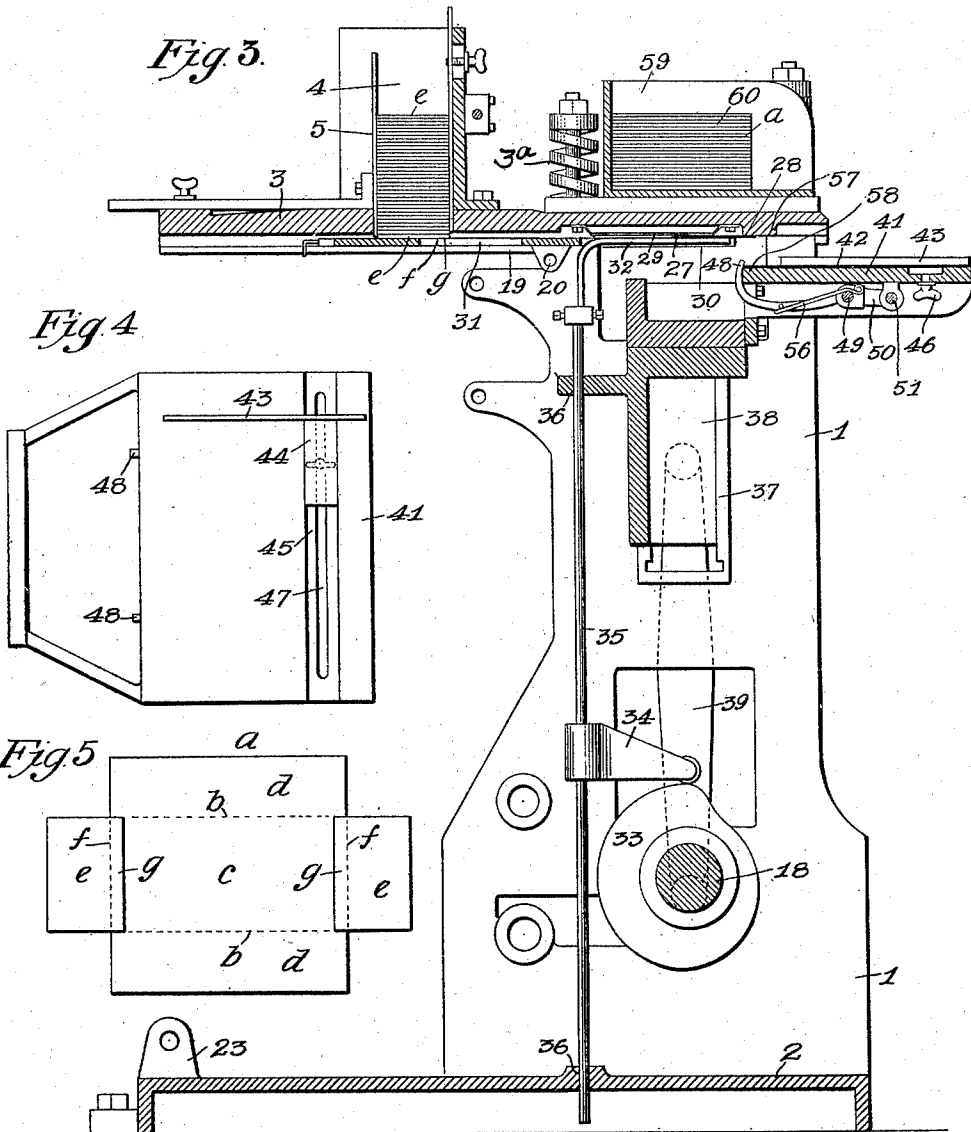
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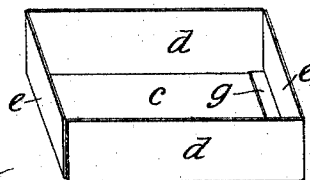
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

CLARENCE W. HOBBS, OF WORCESTER, MASSACHUSETTS.

PIECING-MACHINE FOR PAPER-BOX BLANKS.

966,834.

Specification of Letters Patent.

Patented Aug. 9, 1910.

Application filed June 29, 1903. Serial No. 163,471.

To all whom it may concern:

Be it known that I, CLARENCE W. HOBBS, a citizen of the United States, residing at Worcester, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Piecing-Machine for Paper-Box Blanks, of which the following is a specification, accompanied by drawings forming a part of the same, in which—

Figure 1 represents a side view of a piecing-machine embodying my invention. Fig. 2 is a front view. Fig. 3 is a vertical sectional view. Fig. 4 is a top view of the lower pressing die. Fig. 5 represents a paper box blank after the operation of piecing has been performed, and Fig. 6 is a perspective view of a box blank with the sides turned up at right angles to the bottom of the box.

Similar letters and figures of reference refer to similar parts in the different views.

The object of my invention is to produce a machine by which the operation of piecing a paper-box blank, hitherto done by hand, may be performed in a more rapid and efficient manner. A pieced box blank is shown in Fig. 5 and comprises three pieces of cardboard pasted together at their edges and suitably scored to enable them to be bent on their scored lines to form the bottom and sides of a box body from which the box is completed by staying the corners of the body with stay-strips and covering the outer surface with a strip of covering paper.

As shown in Fig. 5 the box blank is formed from a piece of cardboard *a*, which is scored on the under side on the broken lines *b, b*, the central section *c* forming the bottom of the box, and the side sections *d, d* the two sides of the box. Attached to the opposite ends of the central section *c* are pieces *e, e* which are scored on the under side on the broken lines *f, f*, with the scored lines *f, f* coinciding with the edges of the piece *a*. When the blank is completed as shown in Fig. 5, the section *c* forms the bottom of the box, and the sections *d, d* and *e, e* form laterally projecting wings which are turned up on the scored lines *b, b* and *f, f* to form the sides of the box as represented in Fig. 6. So called "pieced box blanks" are well known in the art of paper-box making, but the operation of attaching the separate pieces together to form the box blank has hitherto been done by hand. So far as I am aware,

the mechanism hereinafter described for accomplishing this purpose is the first device for accomplishing this result by mechanical means.

My piecing machine comprises the following instrumentalities arranged for conjoint action and operatively connected with a single driving shaft, viz., means for supporting the said pieces, *e, e* in a vertical stack from which they may be individually fed to a pressing machine; means for applying paste to the narrow margins *g, g*; means for individually feeding the pasted pieces forward to bring their pasted margins *g, g* between the dies of the pressing machine; means for supporting the central piece *a* in a plane parallel with the pasted piece *e*; means for determining the position of the piece *a* on its supporting surface with one end of its central section *c* in registration with the scored line *f* on the piece *e* which has been brought into position to be attached thereto, and means for applying pressure to the overlapping edges of the pieces *a* and *e*.

Referring to the accompanying drawings 1, 1 represent two upright sides of the framework supported upon a base 2 and united at the top by a table 3, said table being capable of a slight yielding movement resisted by the spiral springs 3^a. Mounted upon the table 3 is a box 4 adapted to hold a vertical stack 5 of pieces *e* having their forward edges scored as at *f*, Fig. 5, forming a margin *g* between the forward edge and the scored line *f*. Beneath the stack of pieces is a paste-trough 6 and between the stack 5 and paste-trough 6 is a rocking shaft 7 provided with radial fingers 8. The rocking motion is imparted to the shaft 7 by any suitable actuating mechanism, in the present instance consisting of a toothed rack 9, engaging a pinion 10 on the shaft 7, a reciprocating motion being imparted to the rack 9 by means of a rocking lever 11, attached to one end of a shaft 12 held in a bearing 13, the opposite end of the shaft 12 having a radial arm 14, carrying a cam roll 15, running in a cam groove in a cam 16, on the cam shaft 18. Sliding in horizontal ways beneath a stack 5, is a reciprocating carrier 19 having lugs 20 pivotally connected by links 21, with the upper end of a lever 22, which is pivoted at its lower end to a bracket 23. The lever 22 is connected near its lower end by a link 24 to an eccentric strap 25

carried on an eccentric 26 on the cam shaft 18. The carrier is provided near its forward end with a projecting rib 27, which on the rearward movement of the carrier is brought toward the rear edge of the lower piece *e* in the stack 5, so that on the forward movement of the carrier, the lower piece in the stack 5 will be carried forward supported upon the forward end of the carrier and in front of the rib 27, into its forward position as shown at 28, Figs. 1 and 3. The forward movement of the carrier 19 carries the piece *e* beneath a yielding blade-spring 29, which applies sufficient frictional resistance to the forward movement of the piece *e* to hold it in close contact with the pushing rib 27. The reciprocating carrier 19 consists of a frame sliding in horizontal ways and provided with a forwardly extending tongue 30, upon which the pieces *e* are supported and carried forward and also with a gridiron opening 31. The tongue at its extreme rearward position, however, uncovers the margin *g* of the lower piece *e* to allow the pasting fingers 8 to contact therewith through said gridiron opening 31 when rocked into the position shown at 8¹. When one of the pasted ends has been carried forward into the position shown at 28, Figs. 1 and 3, it is held in position by a pair of bent fingers 32, which are carried against the pasted piece of cardboard on each side of the supporting carrier by means of a cam 33, which lifts the arm 34 attached to rods 35, held in vertical bearings 36 and supporting upon their upper ends the fingers 32. The contact of the bent fingers with the pasted piece of cardboard holds it firmly against the under side of the table 3 and allows the carrier to be retracted. The above described mechanism for pasting the pieces *e* of cardboard and carrying them from the stack 5 to the position shown at 28 is substantially like the corresponding mechanism shown and described in the Letters Patent of the United States issued to me November 10, 1903, No. 743,642, and its construction and operation will be well understood by those conversant with box making machinery.

Sliding in ways 37 in the upright sides 1, is a sliding crosshead 38, connected on each side by links 39, with a crank pin 40 carried by the cam shaft 18, whereby a vertical reciprocating motion is given to the crosshead 38. Mounted upon the crosshead 38 is a horizontal table 41, capable of supporting one of the pieces *a* in the position shown at 42, Figs. 1 and 3, parallel with one of the pasted pieces *e* held in the position 28. The piece *a* is held in proper registration by bringing one of its sides into contact with a side guide 43, which consists of a gage plate attached to a tongue piece 44, sliding in a groove 45 in the face of the table 41, and

adjustably held in position by a clamping screw 46, which moves in a slot 47 in the bottom of the groove 45. The forward edge of the piece supported on the table 41 is held in proper registration with the scored line on the pasted piece *e* by means of a pair of stop fingers 48, which in their normal position project above the plane of the supporting table 41. The fingers 48 are attached to a shaft 49, which is capable of a slight rocking motion in a pair of arms 50, which are attached to a rod 51 provided with right and left hand screw threads 52 and 53, and journaled in bearings 54 on the under side of the table 41.

The rod 51 is provided with a crank handle 55 by which the rod may be rotated to increase or decrease the distance between the stop fingers 48, which are held in their raised or normal position by means of springs 56. One of the pieces *a* having been placed in position with its registration determined by the side guide 43 and the stop fingers 48, its inner edge is brought into contact with the forward pasted margin of the piece *e*, by the upward movement of the crosshead 38 firmly pressing the two together between the two pressing members, consisting of the upper die 57 on the under surface of the table 3, and the inner edge of the table 41 forming the lower die 58. For convenience of the operator a receptacle 59 is mounted upon the forward end of the table 3 for holding a stack 60 of the pieces *a*. The cam shaft 18 is provided with a gear wheel 61, which is engaged by a pinion 62 on a countershaft 63, to which power is applied by a belt pulley 64, connected with the shaft 63, by any suitable clutching mechanism capable of being operated by a foot treadle 65, by which a slow rotary movement is imparted to the cam shaft 18, thereby actuating the pasting fingers 8, the carrier 19, gripping fingers 32, and crosshead 38, each at the proper period of time to perform the operations as above described.

The operation of the machine is as follows:—A supply of pieces *a* is placed in the receptacle 59 and a supply of pieces *e* is placed in the box 4, the pieces *a* being scored on the lines *b*, *b* and the pieces *e* being scored on the lines *f*, as represented in Fig. 5. Rotary motion is imparted to the cam shaft 18 and by means of suitable shaped cams properly timed reciprocating movements are imparted to the toothed rack 9, carrier 19, gripping finger 32, and crosshead 38. One of the pieces *a* is removed by hand from the receptacle 59 and placed upon the supporting table 41, while the latter is in its lowest position, and the proper registration of the piece *a* is secured by bringing one edge against the side guide 43, and bringing its advancing edge against the stop fingers 48. In the rearward position of the carrier

19, the projecting rib 27 of the carrier is brought to the rear of the stack 5, and as the carrier moves forward, the rib 27 engages the rear edge of the lowermost piece *e* in the stack and carries it forward supported upon the advancing end of the carrier or tongue piece 30, into the position shown at 28, Fig. 3, paste having already been applied to the forward edge or margin *g*, of the piece, by means of the rocking shaft 7 and radial pasting fingers 8, actuated by the reciprocating rack bar 9. In the forward position of the piece *e*, as held upon the carriage 19, its pasted margin is brought beneath the upper die 57 and directly over the forward edge of the piece *a*, supported upon the table 41, with the scored lines *f* of the piece *e* in exact registration with the forward edge of the piece *a* supported upon the table 41. The overlapping edges of the two pieces *a* and *e* are then pressed together between the dies 57 and 58, by the upward movement of the crosshead 38, and as the table 41 moves upwardly, the yielding stop fingers 48 are pressed downward by their contact with the upper die 57 upon each side of the piece *e* as it is held upon the carrier 19. The piece *a* is then reversed on the supporting table and a second piece *e* attached to its opposite edge.

I do not wish to confine myself to the specific mechanism for pasting and feeding the pieces *e* for various devices adapted to accomplish these objects are in use in machines employed in the manufacture of paper boxes; neither do I confine myself to any specific construction or arrangement of the mechanism for actuating the pasting, feeding and pressing devices.

I have herein used the term cardboard to designate any suitable material from which bodies of the so-called paper boxes are made, including strawboard, leatherboard, and similar material.

I do not confine myself to the use of gripping fingers 32 for the purpose of holding the pieces *e* in proper position to the pressing mechanism, but I consider their use preferable, for the reason that it enables the carrier 19 to be retracted before the pressing dies come together and causes the end 28 to be held during the backward movement of the carrier. If no gripping fingers 32 are used, it would be necessary to cause the carrier to dwell in its forward position in order to support the pasted piece *e*, while the piece *a* was being moved upwardly into contact therewith.

What I claim as my invention and desire to secure by Letters Patent is:—

1. A piecing machine for box blanks, comprising a table for supporting a sheet of cardboard, adjustable stops for determining the position of said sheet on said table, a feeding mechanism for carrying a second

sheet of cardboard, provided with a pasted edge, into a position overlapping a portion of said first sheet, a support arranged to contact with the under side of said second sheet, means for holding said second piece in contact with said support against the backward movement of said feeding mechanism, and means for bringing the overlapping edges of said sheets into contact and exerting pressure upon them.

2. A piecing machine for box blanks, comprising a table for supporting a sheet of cardboard, a carrier for bringing a second sheet of cardboard provided with a pasted edge into a predetermined position overlapping a portion of said first sheet, means for actuating said carrier, a support arranged to contact with said second sheet and to support it against gravity after said carrier has been removed, means for holding said sheet in contact with said support against the movement of said carrier, and means for bringing the overlapping portions of said sheets into contact and exerting pressure upon them.

3. A piecing machine for box blanks, comprising a reciprocating table for supporting a sheet of cardboard, a die arranged to cooperate with said table, a carrier for bringing a second sheet of cardboard, having a pasted edge, into a predetermined position between said die and said table, and adjustable registering means extending above said table below said die and arranged to contact with one edge of said first sheet on said table, said means arranged to yield transversely to said table when in contact with said die.

4. In a piecing machine for box blanks, the combination with a reciprocating table for supporting a sheet of cardboard, of a die overlapping said table and arranged to cooperate with it, a feeding mechanism for bringing a second sheet of cardboard, to which paste has been applied, between said die and said table, and yielding stops in the path of said die for determining the position of said first sheet of cardboard on said table.

5. A piecing machine for box blanks, comprising a vertically reciprocating table for supporting a sheet of cardboard, a die arranged to cooperate with said table, a horizontally reciprocating carrier for bringing a second sheet of cardboard, having a pasted edge, into a predetermined position between said die and said table, a vertically yielding stop, adjustable for sheets of different widths, projecting above said table below said die arranged to contact with one edge of said first sheet on said table, and an adjustable stop projecting above said table at right angles to said first stop arranged to contact with another edge of said first sheet on said table, said stops arranged to de-

termine the position of said first sheet with relation to the pasted edge of said second sheet.

6. A piecing machine for box blanks, comprising a table for supporting a sheet of cardboard, a carrier for bringing a second sheet of cardboard, having a pasted edge, into a predetermined position above said table, yielding registering means, adjustable for sheets of different widths, projecting above said table and yielding transversely thereto, arranged to contact with one edge of said first sheet on said table, adjustable registering means projecting above said table at right angles to said first registering means arranged to contact with another edge of said first sheet on said table, thereby determining the position of said first sheet on said table, and means for bringing the overlapping portions of said sheets into contact and applying pressure thereto.

7. A piecing machine, comprising a table

for supporting a sheet of cardboard, yielding means, adjustable for sheets of different widths, for registering said sheet with one edge of said table, adjustable means for determining the position of said sheet in a line parallel with said edge, a carrier for bringing a second sheet of cardboard, having a pasted edge, into a predetermined horizontal position with relation to said edge of said table, supporting arms beyond said edge of said table for holding said second sheet in said position, means for holding said sheet in contact with said arms, and means for bringing the overlapping portions of said sheets into contact and applying pressure thereto.

Dated this 13th day of June 1903.

CLARENCE W. HOBBS.

Witnesses:

RUFUS B. FOWLER,
PENELOPE COMBERBACH.