

No. 695,369.

Patented Mar. 11, 1902.

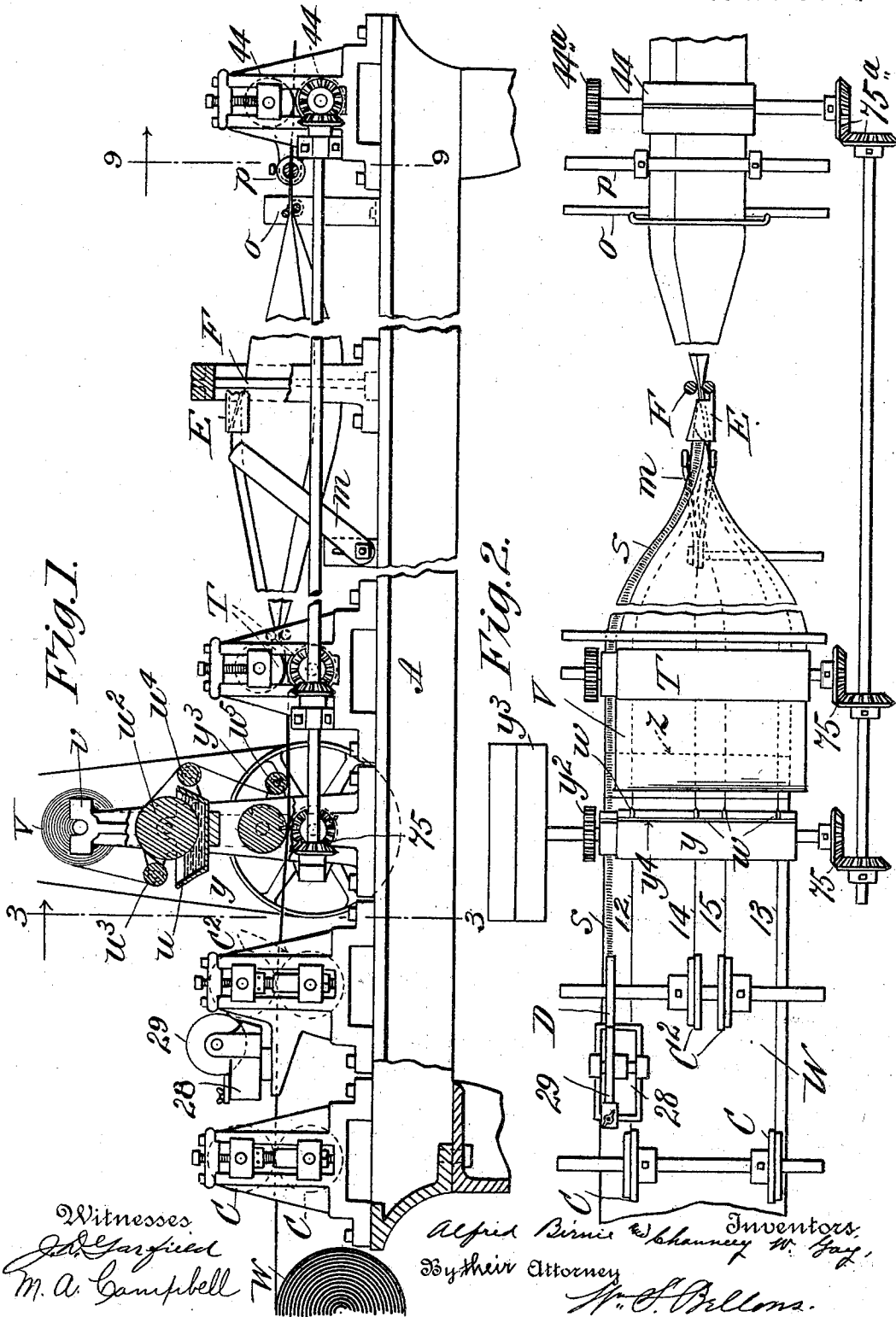
A. BIRNIE & C. W. GAY.

PAPER BOX MACHINE.

(Application filed Oct. 28, 1901.)

(No Model.)

4 Sheets—Sheet 1.



No. 695,369.

Patented Mar. 11, 1902.

A. BIRNIE & C. W. GAY.

PAPER BOX MACHINE.

(Application filed Oct. 28, 1901.)

(No Model.)

4 Sheets—Sheet 2.

Fig. 3.

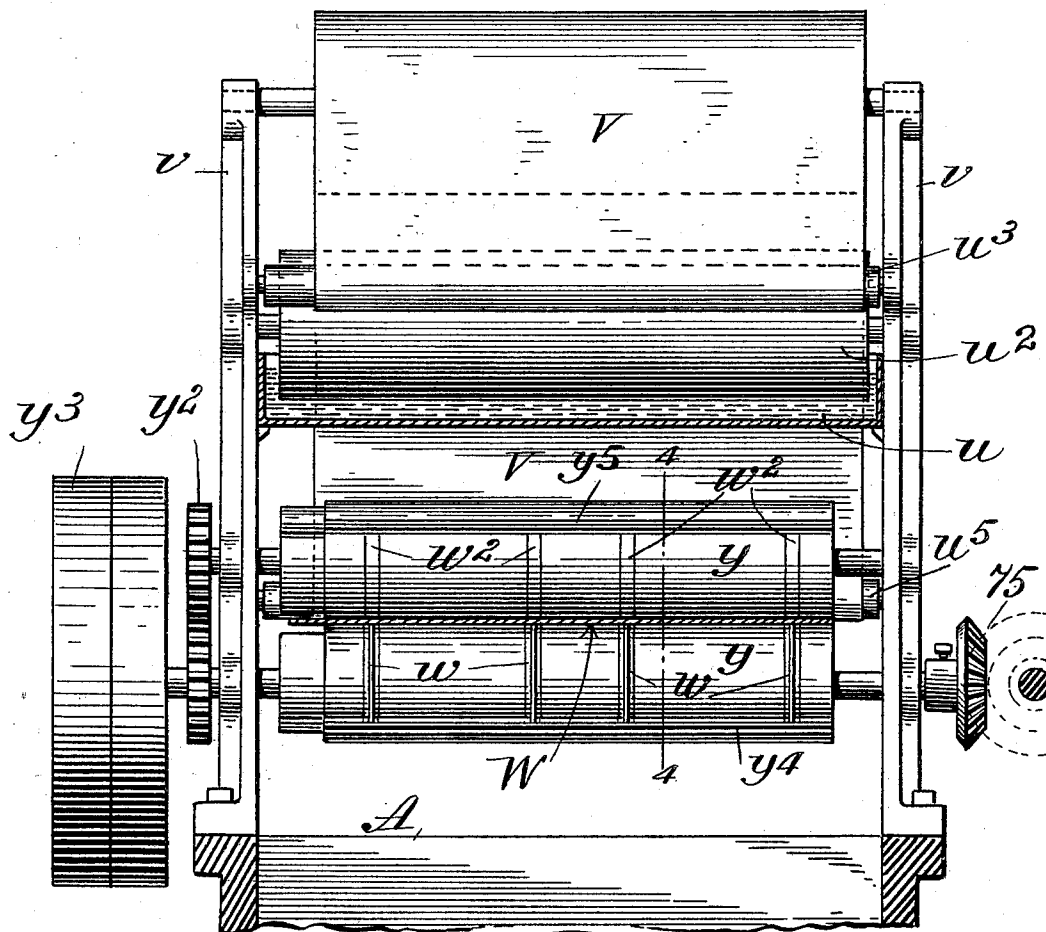
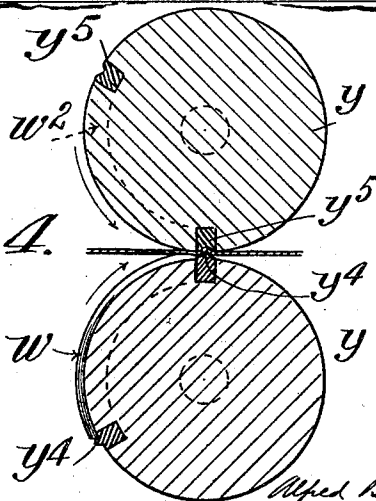
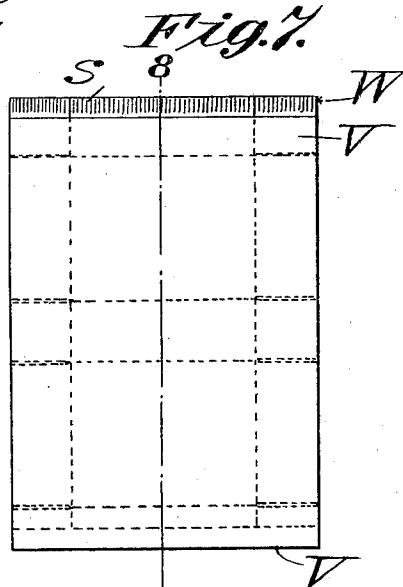
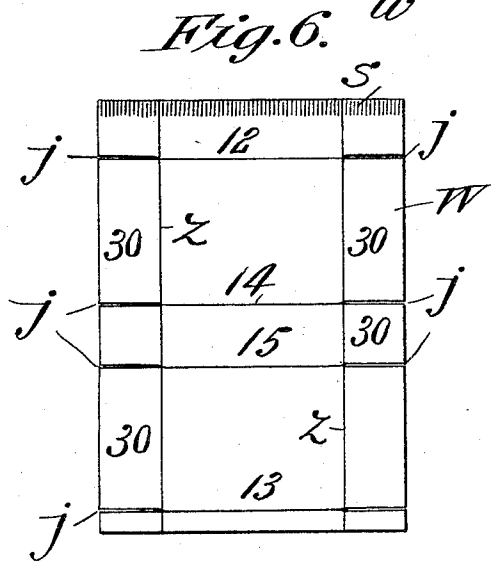
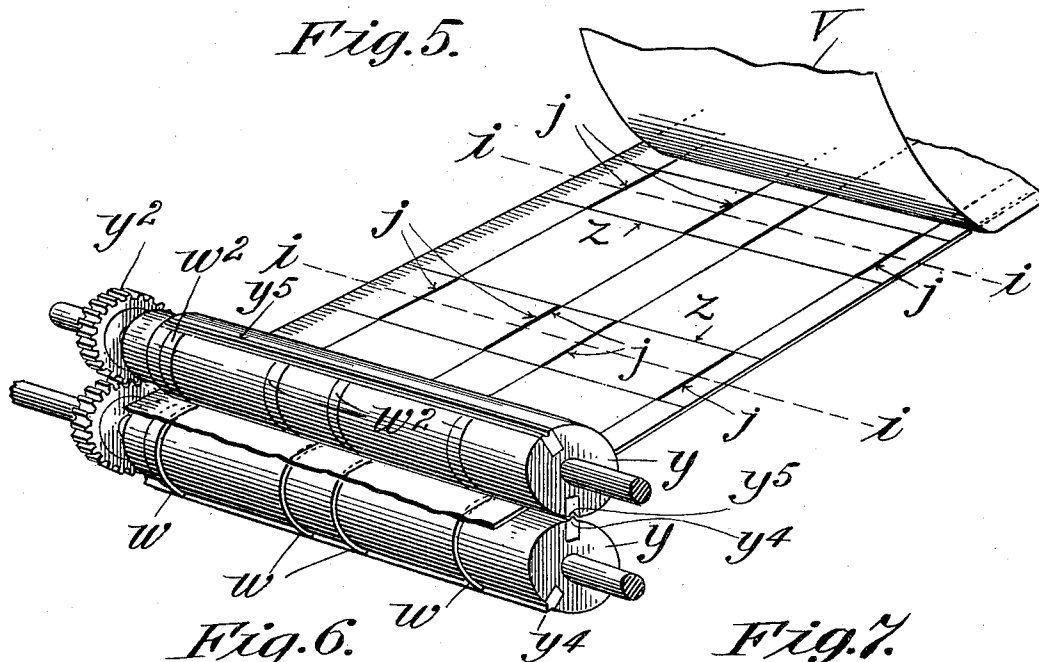


Fig. 4.



Witnesses
J. D. Sanford
M. A. Campbell

Inventors
Alfred Birnie & Clarence W. Gay
By their Attorney
Wm. J. Bellows.



Witnesses
J. A. Garfield
M. A. Campbell

Alfred Birnie Inventors.
Chauncey W. Gay
 By their Attorney,
W. J. Bellona.

No. 695,369.

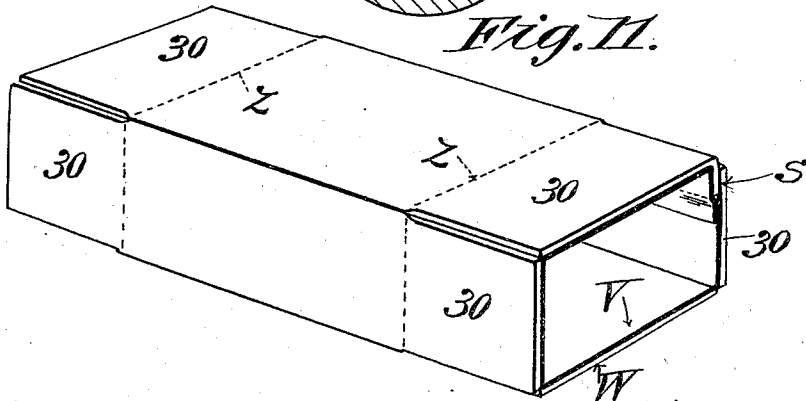
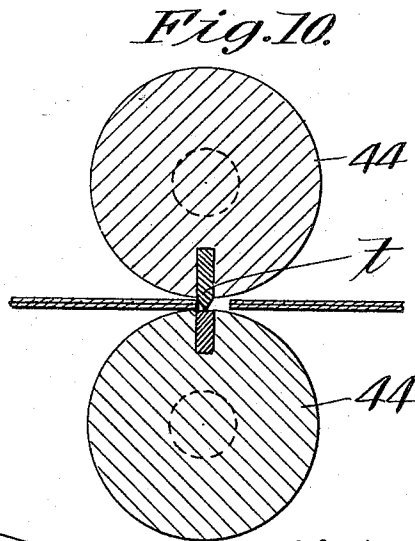
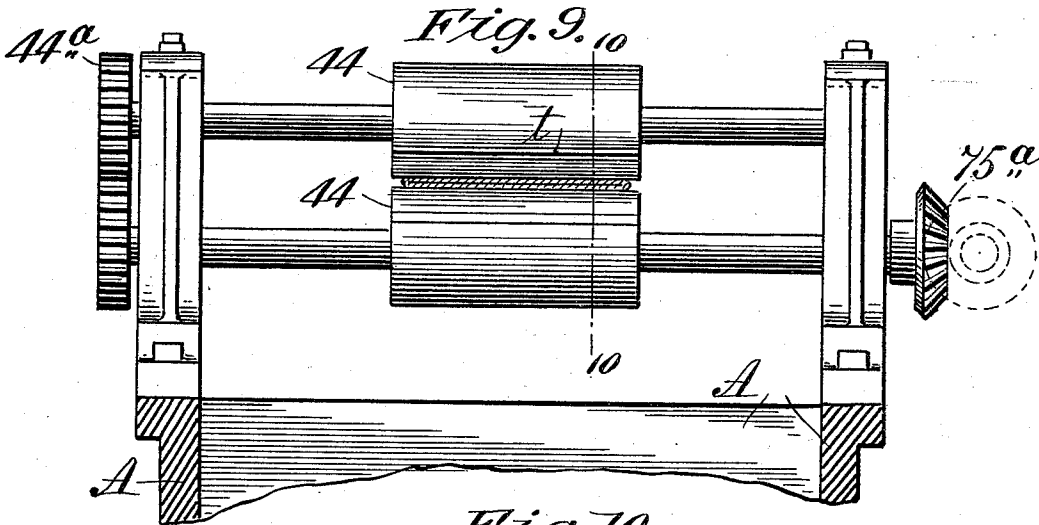
Patented Mar. 11, 1902.

A. BIRNIE & C. W. GAY.
PAPER BOX MACHINE.

(Application filed Oct. 28, 1901.)

(No Model.)

4 Sheets—Sheet 4.



Witnesses
J. D. Garfield
M. A. Campbell

Alfred Binie & Chauncey H. Fay, Inventors,
By their Attorney,
Wm. L. Bellows.

UNITED STATES PATENT OFFICE.

ALFRED BIRNIE, OF SPRINGFIELD, AND CHAUNCEY W. GAY, OF WEST
SPRINGFIELD, MASSACHUSETTS.

PAPER-BOX MACHINE.

SPECIFICATION forming part of Letters Patent No. 695,369, dated March 11, 1902.

Application filed October 28, 1901. Serial No. 80,196. (No model.)

To all whom it may concern:

Be it known that we, ALFRED BIRNIE, a resident of Springfield, and CHAUNCEY W. GAY, a resident of West Springfield, in the county of Hampden and State of Massachusetts, citizens of the United States of America, have invented certain new and useful Improvements in Paper-Box Machines, of which the following is a full, clear, and exact description.

10 This invention relates to improved combinations or arrangements of instrumentalities by means of which the machine is constituted for making cartons or paper boxes which preferably have a lining of waxed paper, paraffin-paper, or other suitable imper-
15 vious or non-absorbent material; and the object of the invention is to provide a machine having the capability of practically, rapidly, and satisfactorily making the cartons.

20 The invention consists in the combinations, with means for feeding or carrying forward from a roll or supply a strip of card or paper board suitable for the making of the body of the box and the closing end flaps thereof,
25 means for scoring the strip on parallel longitudinal lines, and means for supplying an adhesive to the surface of a suitable marginal portion of the strip, and means for slitting the cardboard for dividing portions thereof
30 which constitute the end-closing flaps for the box or carton, of means for bringing in superimposed relation upon the scored and slitted strip a strip of waxed paper which is caused to become adherent, preferably remov-
35 ably adherent on the cardboard strip, and means for transforming the superimposed strips into the form of a tube suitably secured at overlapping marginal portions of the cardboard strip, and in addition to and in
40 combination with the foregoing means also severing means for cutting the tube into sections on lines intersecting the slits which divide the portions constituting the closing flaps.

45 The invention furthermore consists in arranging and combining the coacting instrumentalities so that the strip of sheet waxed paper will be superimposed on the scored and slitted cardboard strip, with its one edge lo-
50 cated suitably inside of the edge of the card-

board and its other edge portion overlapping and extending beyond the other edge of the cardboard, so that in the further transformation of the cardboard and its lining the marginal portion of the cardboard which is left
55 uncovered permits the actual contact of the other marginal portion of the cardboard to be directly secured thereto by sticking, and so that the edgewise overlapping portion of the lining-sheet may internally cover the seam. 60

Our improved machine is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation, the proportionate length of the machine being somewhat shortened. Fig. 2 is a plan view of a mechanism shown in Fig. 1, the framing and support, which are presupposed, being omitted for the purpose of simplicity and clearness. Fig. 3 is a cross-sectional view, on a larger scale, as seen about on the line 3 3 looking
70 in the direction of the arrow, Fig. 1. Fig. 4 is a view further enlarged cross-sectionally of the axes of the pair of rolls which transversely score the strip on the lines for folding for the end-closing flaps angularly to the
75 box side constituting portions and which also slit the blank on lines which divide the portions which constitute the end-closing flaps one from the other. Fig. 5 is a perspective view of the last-mentioned pair of rolls, showing the strip (which has been longitudinally
80 scored previous to being brought therebetween) transversely scored and longitudinally slitted and showing the strip of lining-sheet material being brought facewise onto the so
85 scored and slitted strip. Fig. 6 is a plan view of the scored and slitted strip shown with a line of paste along one edge which constitute the box-blank; and Fig. 7 is a similar view, but showing the blank as having the sheet of
90 lining material thereon with its one edge within the margin of the box-blank and its other edge overlapping beyond the box-blank. Fig. 8 is a sectional view of the blank on a larger scale, as taken on line 8 8, Fig. 7. Fig. 9 is
95 a cross-sectional view of part of the machine at which the severing of the line-flattened tubular tube is severed into carton-sections. Fig. 10 is a cross-section on a larger scale on line 10 10, Fig. 9, of the severing-rolls. Fig. 100

11 is a perspective view of one of the lined cartons as produced by a severed section of the tube as produced in the present machine.

The lined carton, substantially such as illustrated in Fig. 11, and the product of this machine forms the subject-matter of an application for Letters Patent of the United States filed by us October 14, 1901, Serial No. 78,517.

The present machine, so far as it comprises the means for carrying forward, longitudinally scoring, transforming the strip, and securing by sticking the same into the form of a flattened rectangular tube and the severing mechanism for cutting the tube into sections of uniform length, is substantially the same as the machine described and shown in Chauncey W. Gay's application for Letters Patent of the United States, filed September 6, 1901, Serial No. 74,534.

In the drawings, A represents the framing of the machine, at the rear end of which is mounted a supply-roll W of the cardboard from which the body of the carton is produced.

C C² represent duplicate coacting pairs of step-rimmed scoring-rolls for scoring the cardboard strip on the parallel longitudinal lines 12, 13, 14, and 15; D, the pasting-roll, taking its paste from the roll 29, which runs in the paste or gum box 28, said paste-roll D running in peripheral contact on the marginal portion of the cardboard strip, whereby the line of paste indicated at s, Fig. 2, is laid therealong.

The pair of rolls 44 44 at the farther or last end of the machine constitute the draft-rolls for the strip. m represents a V-shaped deflector, and E the upturning device for the marginal portion of the cardboard strip to be thereafter brought against and stuck to the pasted opposite marginal portion V of the strip.

F indicates the pair of bars axially perpendicular to the scoring and pasting devices, by means of which in the passage therethrough of the bent-up strip the latter is creased by a pressing or squeezing action at the diagonally opposite corners of the flattened tube, and the means for reversely twisting the collapsed tube already pressed at two of its diagonally opposite corners, whereby the relatively diagonally opposite two corners are also pressed or creased, may be advantageously comprised in the aforesaid rollers 44 44, which are also the final severing-rolls for the tube, while o and p are flattening-guides and gage devices which assist in the reverse twisting and re-pressing of the flattened tube.

The parts of the mechanism which have been thus far referred to in conjunction with characters of reference as aforesaid are substantially the same as those to which they correspond described in Chauncey W. Gay's aforementioned application for Letters Patent, filed September 6, 1901, Serial No. 74,534, and further description of the means for carrying along the cardboard strip, longitudinally scoring, bending to flattened tubular

form, creasing, reversely flattening, re-pressing, and finally severing the same into sections is considered superfluous.

We will now proceed to describe the means contributing to the novelty and present subject-matter of this case which are employed in combination with and as a part of the machine referred to briefly as above for longitudinally slitting the strip on the lines of division for the separation of the end-closing flaps of the carton, for transversely scoring the strip on the lines on which the end-closing flaps are folded, and for bringing down the lining-sheet onto the box-blank-forming strip, which latter has been scored and slit, and rendering the lining removably adherent thereon, whereby such lining-sheet is carried along with the strip from which the carton paper is to be produced and therewith made into the lined carton and delivered completed up to the stage of having its end flaps and the linings therefor closed. Next beyond the paired longitudinal scoring-rolls C and C² are a pair of rolls y y, between which the strip of cardboard runs, said rolls being of equal diameter and geared together at y² to run at the same speed. The extended arbor of one of these rolls is utilized as the driving-shaft of the machine and provided with the pulleys y³. These rolls are provided the one with scoring-ribs y⁴, parallel with the axis of the roll, and the other with hardened grooved plates y⁵ to match with said ribs in the revolutions of these parts for cross-scoring the cardboard strip on the lines z z corresponding to the lines for bending the end-closing flaps right-angularly to the sides of the box, which sides are constituted by the rectangular sections located between the cross-scoring lines z z. The said rolls y y have circumferences in the machine designed as here illustrated corresponding to the length of a carton inclusive of its distended opposite end flaps 30, and one of said rolls has four suitably-separated partially-circular slitting-blades w in planes perpendicular to the axis of the roll and coincident with lines of longitudinal scoring of the strip, the lengths of these ribs being double the length of the end flaps 30 which the carton is to have. The other roll of the pair y y has hardened arc-shaped blocks w² set therein to match with the slitting-blades w. At a suitable location above the plane of feed of the cardboard strip is a support v for a supply-roll of the wax or lining paper V, and adjacent this supply-roll is a paste-box u, having a paste-roller u² therein. The wax-paper is by the guide-rolls u³ u⁴ carried in surface contact on the paste-roll u², receiving a coating of paste thereon throughout the greater part of its area, or in strips or patches, according to the continuity of the peripheral surface of the paste-roll, but preferably not at its one marginal portion which is brought to overlap the edge of the cardboard strip, as hereinafter pointed out. Another guide-roll u⁵ is located a short distance

beyond and parallel with the upper one of the cross-scoring and slitting rolls *y y*, with its under peripheral portion practically on or very near the plane of the upper side of the strip W. The waxed-paper strip V is brought down partially around and under the roll *u*⁵ and assumes contact on and will thereafter run along with the strip W next coming between the pair of compression-rolls T T, which are geared together and also have driving-gear connections, as shown at 75 75, with the main shaft. Said pair of rollers T T are draft-rollers as well as compression-rollers. The strip W, having the waxed-paper strip V now adherent thereon, because of the pressure is further carried through the machine subject to the action of the mechanisms for bending the combined strips into the form of a flattened tube, causing the portion having the line of glue *s* to be closely and securely stuck to the opposite marginal and reversed side of the strip W for the security of the tube, for further, by a twisting and reversing action on the tube, causing it to be flattened on diagonally opposite corners and pressed and for finally bringing it to the cross-severing blade *t* on the one of the rolls 44 of the final pair in the machine, which are also draft-rolls, substantially as carried out in the operation of the aforementioned machine, application for patent for which was filed by said Gay, as aforesaid. The said pair of rolls 44 being geared together at 44^a, being properly distantly located beyond and by the gearings 75^a running properly in time with the rolls *y y* and T T, operate to squarely and transversely cut off the tube midway of the length of the longitudinal slits *j j*, which divide the end-closing flap for the carton, so that the group of lines of slitting are seen to be in portions of the continuously-running strip utilized in the making of the end portions of two separate cartons.

In the perspective view, Fig. 5, wherein the portion of the running strip is seen as longitudinally and also transversely scored and longitudinally slitted throughout short portions of the length of the strip on longitudinal lines which are coincident with the longitudinal scorings, the transverse dotted lines *i i* represent the lines on which when the strip is brought to the latter end of the machine the severing-blade *t* acts, cutting off the then-folded-up stock, which developed would appear as the blank shown in Fig. 6 or the lined blank shown in Fig. 7.

It will be understood that the supply-roll for the strip V is mounted so that one edge of the strip is relatively within the margin of the cardboard strip W, (this leaving such marginal portion bare or raw to receive the glue at *s* and to permit direct and actual contact for certainty of sticking with the other marginal portion of the cardboard strip,) while the other marginal portion of the waxed-paper strip V overlaps the adjacent margin of the cardboard strip to insure the lining

covering the seam, all as rendered manifest in Figs. 2, 3, and 5.

In practice the glue employed in the box 28 and therefrom applied along the line *s* on the cardboard strip is a comparatively heavy and strong adhesive, such as the fish-glue commonly employed in the manufacture of paper boxes, while the adhesive employed for sticking the waxed paper onto the surface of the cardboard strip is a less heavy and tenacious substance, so that the lining is capable of being stripped without rupture from the inner face of the flaps of the carton, so that in the closing of the flaps of the carton the linings for the flaps may be detached from the flaps and folded down on the end of the package, and so that in the folding down of the last one of the flaps that one, at least, will have its inner face uncovered by the lining and practically in its natural condition and susceptible of being stuck and secured closed by any proper paste or glue.

The wax-paper lining to the box, inclusive of its portions lying on the slitted and separated end-closing flaps of the carton, is continuous entirely around the inner surface of all the said end flaps.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a machine for making blanks for cartons having waterproof linings, the combination of means for progressing a strip of cardboard; means for longitudinally scoring the strip, and for longitudinally slitting the strip at intervals in its length, means for applying a strip of wax-paper or analogous material on the surface of the scored and slitted strip, and means for causing the adhesion of the moisture-proof strip, thereon.

2. In a machine for making blanks for cartons having waterproof linings, the combination of means for progressing a strip of cardboard; means for longitudinally scoring the strip, and for longitudinally slitting the strip at intervals in its length, means for supporting a strip of wax-paper, or analogous material, means for applying an adhesive on the surface thereof, means for guiding the so-prepared wax-paper onto the surface of the scored and slitted strip, and means for causing the adhesion of the moisture-proof strip, thereon.

3. In a machine for making blanks for cartons having waterproof linings, the combination of means for progressing a strip of cardboard; means for longitudinally scoring the strip, and for longitudinally slitting the strip at intervals in its length, means for supporting a strip of wax-paper, or analogous material with its one margin offset and relatively inside of the margin of the cardboard strip, means for applying an adhesive on the surface of the wax-paper, means for guiding the so-prepared wax-paper onto the surface of the scored and slitted strip, and means for causing the adhesion thereof, thereon.

4. In a machine for making blanks for car-

tons having waterproof linings, the combination with means for progressing a strip of cardboard; and means for longitudinally scoring the strip, and for longitudinally slitting the strip at intervals in its length; of a support for a supply-strip of wax-paper, a paste-box and paste-roller, means for guiding the wax-paper over the paste-roller, means for guiding the pasted wax-paper strip into running contact on the cardboard strip, and rolls for pressing the wax-paper strip and cardboard strip firmly together.

5. In a machine for making blanks for cartons having waterproof linings, the combination of means for progressing a strip of cardboard; means for longitudinally scoring the strip, and for longitudinally slitting the strip at intervals in its length; means for applying a strip of wax-paper or analogous material on the surface of the scored and slitted strip, and causing the adhesion thereof, thereon, and means for severing the combined strips on lines transversely intersecting the longitudinal slits which are in the cardboard only.

6. In a machine for making blanks for cartons having waterproof linings, the combination of means for progressing a strip of cardboard; means for longitudinally scoring the strip, a pair of rolls one of which has arc-formed peripheral blades in planes perpendicular to the axis of the roll, for longitudinally slitting the strip at intervals in its length, means for supporting a strip of wax-paper, or analogous material, and for applying an adhesive on the surface thereof, a roll in advance of the said slitting-roll and adjacent the plane of travel of the cardboard strip, for guiding the so-prepared wax-paper onto the surface of the already scored and slitted strip, and a pair of pressure-rolls therebeyond.

7. In a machine for making cartons having waterproof linings, the combination of means for progressing a strip of cardboard; means for marginally pasting such strip; means for longitudinally scoring the strip, and for longitudinally slitting the strip at intervals in its length; means for applying a strip of wax-paper or analogous material on the surface of the scored and slitted strip, and causing the adhesion thereof, thereon, and mechanism for bending, and setting, into tubular form the marginally-pasted cardboard strip having the wax-paper adherent therein.

8. In a machine for making cartons having waterproof linings, the combination of means for progressing a strip of cardboard; means for marginally pasting such strip; means for longitudinally scoring the strip, and for longitudinally slitting the strip at intervals in its length; means for supporting a strip of wax-paper and guiding the same onto the surface of, and with its one edge within the margin of the edgewise pasted and scored and slitted cardboard strip; and means for applying an adhesive on the surface of one of said strips which is brought to facewise contact on the

other, and means for pressing said strips together; and mechanism for bending, and setting, into tubular form, the marginally-pasted cardboard strip having the wax-paper adherent therein.

9. In a machine for making cartons having waterproof linings, the combination of means for progressing a strip of cardboard; means for marginally pasting such strip; means for longitudinally scoring the strip, and for longitudinally slitting the strip at intervals in its length; means for applying a strip of wax-paper or analogous material on the surface of the scored and slitted strip, and causing the adhesion thereof, thereon; mechanism for bending, and setting, into tubular form, the marginally-pasted cardboard strip having the wax-paper adherent therein; and means for severing the so-formed lined tube on transverse lines intersecting the longitudinal slits in the outer cardboard layer thereof.

10. In a machine for making cartons having waterproof linings, the combination of means for progressing a strip of cardboard; means for longitudinally marginally pasting such strip; means for longitudinally scoring the strip, and for longitudinally slitting the strip at intervals in its length; means for supporting a strip of wax-paper and guiding the same onto the surface of scored and slitted cardboard strip; with its one edge inside of the marginally-pasted cardboard strip, and with its opposite edge overlapping beyond the other edge of the cardboard strip; means for applying an adhesive on the surface of one of said strips which is brought to facewise contact on the other, and means for pressing said strips together; mechanism for bending, and setting, into tubular form, the marginally-pasted cardboard strip having the wax-paper adherent therein, and mechanism for severing the tube on transverse lines intersecting the slits in the cardboard outer layer thereof.

11. In a machine of the character described, the combination with longitudinal scoring devices for the cardboard strip; a paste-roll to run on the margin of the strip, and paste-supplying means therefor; a pair of rolls one of which has peripheral partially-encircling slitting-blades w , and a cross-scoring rib y^t , parallel with its axis, and a pair of draft and pressure rolls $T T$ therebeyond; of a support, and surface-pasting apparatus, for a wax-paper strip, means for guiding said strip onto the cardboard between the slitting-rolls and said pressure-rolls; devices for converting the covered strip into the form of a stuck-seam tube; a pair of rolls beyond the tube-forming devices one of which has a cross-severing blade; and means for rotating the slitting and the cross-severing rolls at corresponding surface speed, substantially as described.

12. In a machine of the character described, the combination with longitudinal scoring devices for the cardboard strip; a paste-roll to

run on the margin of the strip; and paste-supplying means therefor; a pair of rolls one of which has peripheral partially-encircling slitting-blades w , and a cross-scoring rib y^4 parallel with its axis, and a pair of draft and pressure rolls T T therebeyond; of a support, and surface-pasting apparatus, for a wax-paper strip, rolls between the pasting apparatus and the cardboard strip, one u^5 of which has its location between the slitting-rolls and said pressure-rolls and peripherally adjacent the plane of travel of the cardboard strip; devices for converting the covered strip into the form of a stuck tube; a pair of rolls beyond the tube-forming devices one of which has a cross-severing blade, and means for rotating the slitting, and the cross-severing rolls at corresponding surface speed, substantially as described.

13. In a machine for making cartons having

linings of sheet material, the combination of means for progressing a strip of cardboard, devices for marginally pasting same, means for supporting a supply of the lining material, means for applying an adhesive on the surface of one of said strips, means for guiding the lining-sheet onto the surface of the cardboard strip, means for pressing said strips together, and mechanism for bending and setting into tubular form the marginally-pasted cardboard strip with the lining adherent therein.

Signed by us at Springfield, Massachusetts, this 26th day of October, 1901.

ALFRED BIRNIE.
CHAUNCEY W. GAY.

Witnesses:

WM. S. BELLOWS,
M. A. CAMPBELL.