

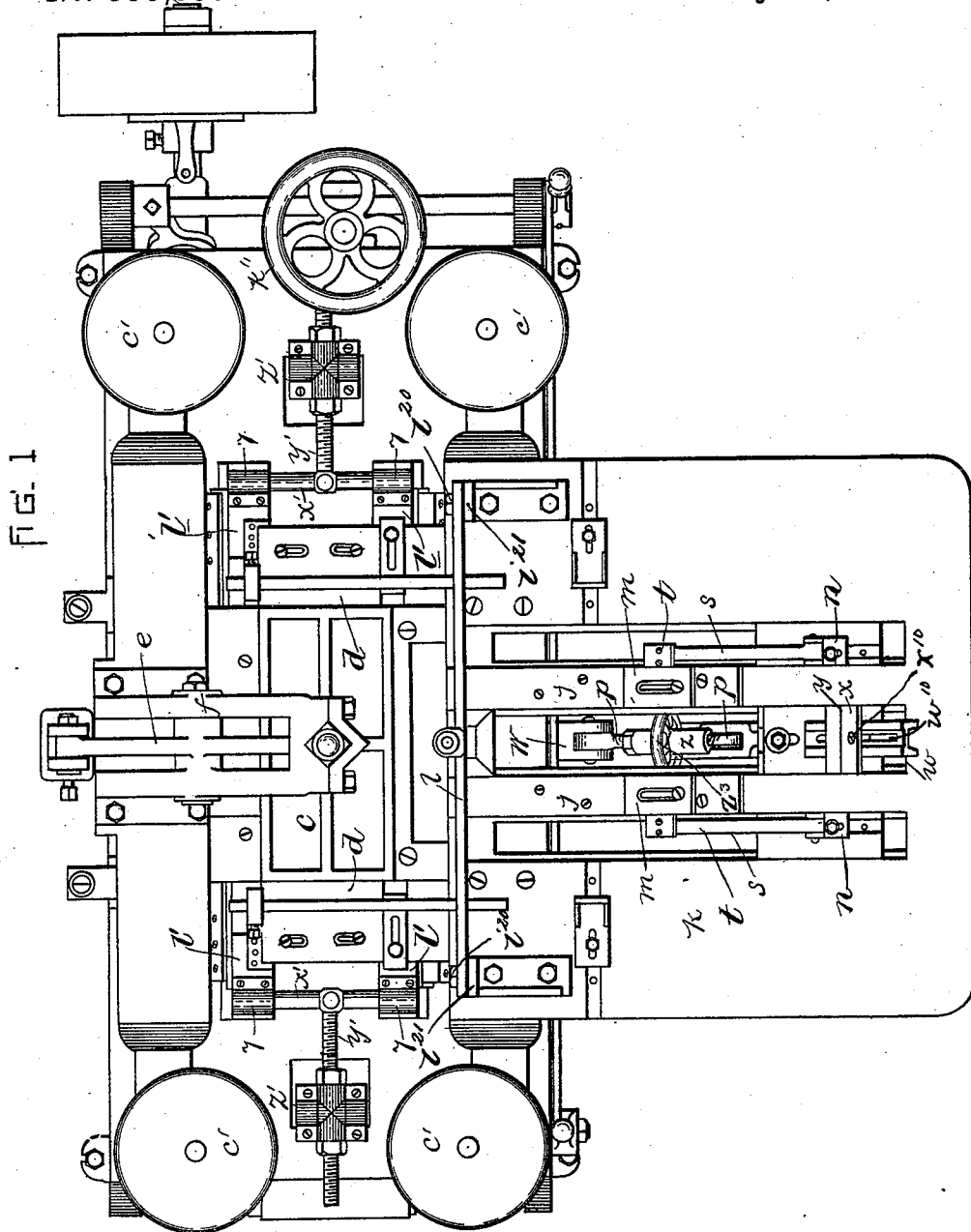
(No Model.)

9 Sheets—Sheet 1.

H. D. STONE & C. THIBODEAU.
PAPER BOX MAKING MACHINE.

No. 538,598.

Patented May 21, 1895.



WITNESSES:

A. D. Harrison

Walter S. McLeod

INVENTORS:

H. D. Stone,
by *Chas. Thibodeau,*
Knight, Brown & Crossley
Attys.

(No Model.)

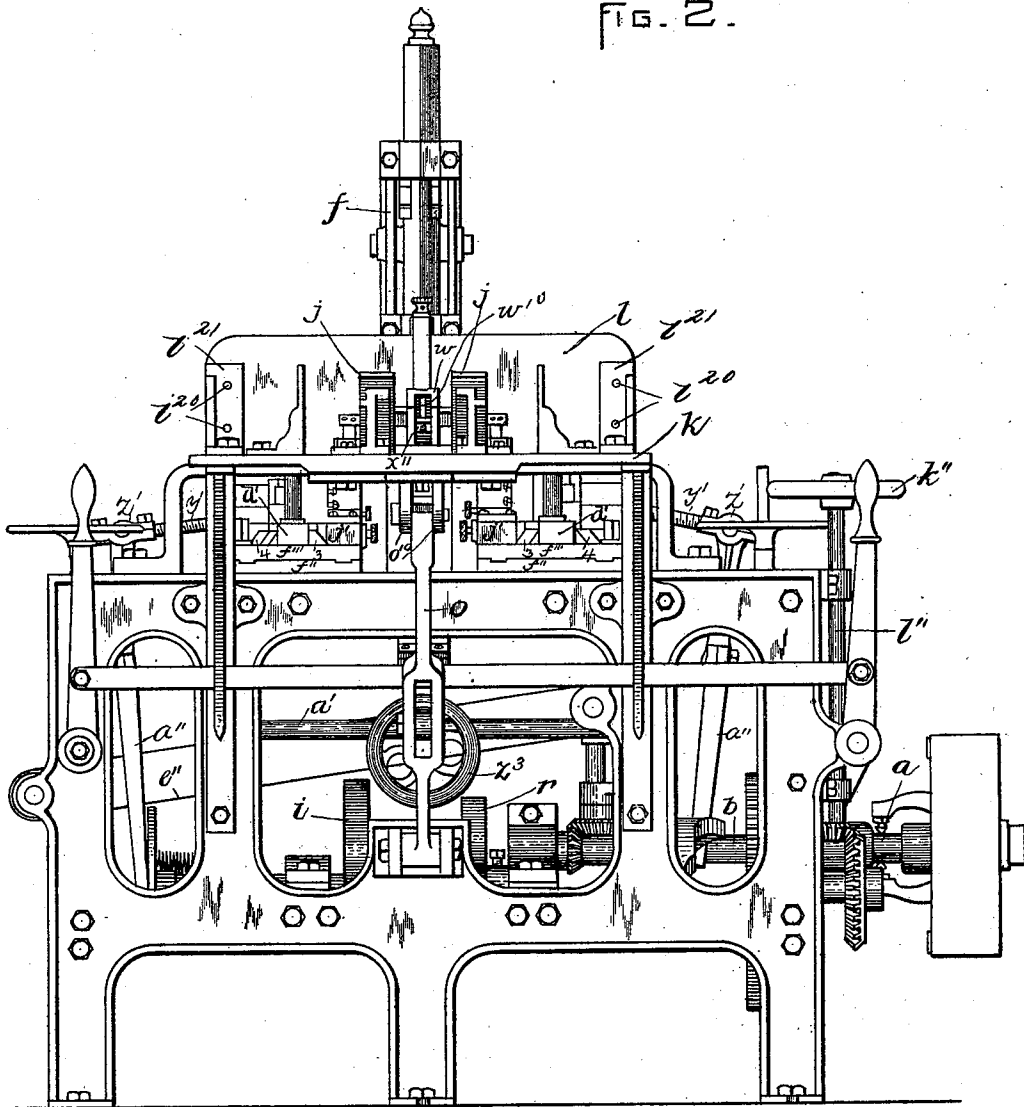
9 Sheets—Sheet 2.

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FIG. 2.



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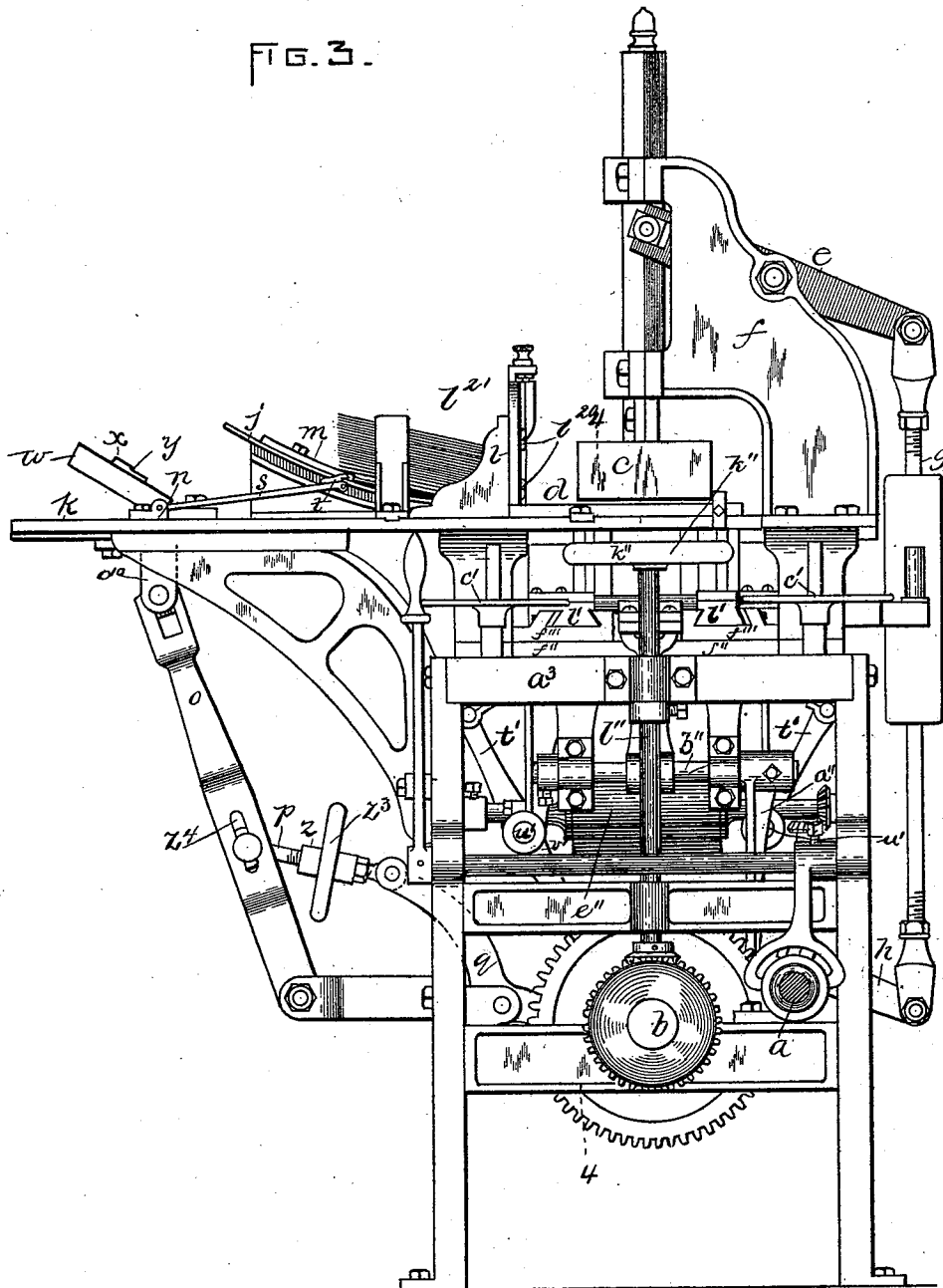
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FIG. 3.



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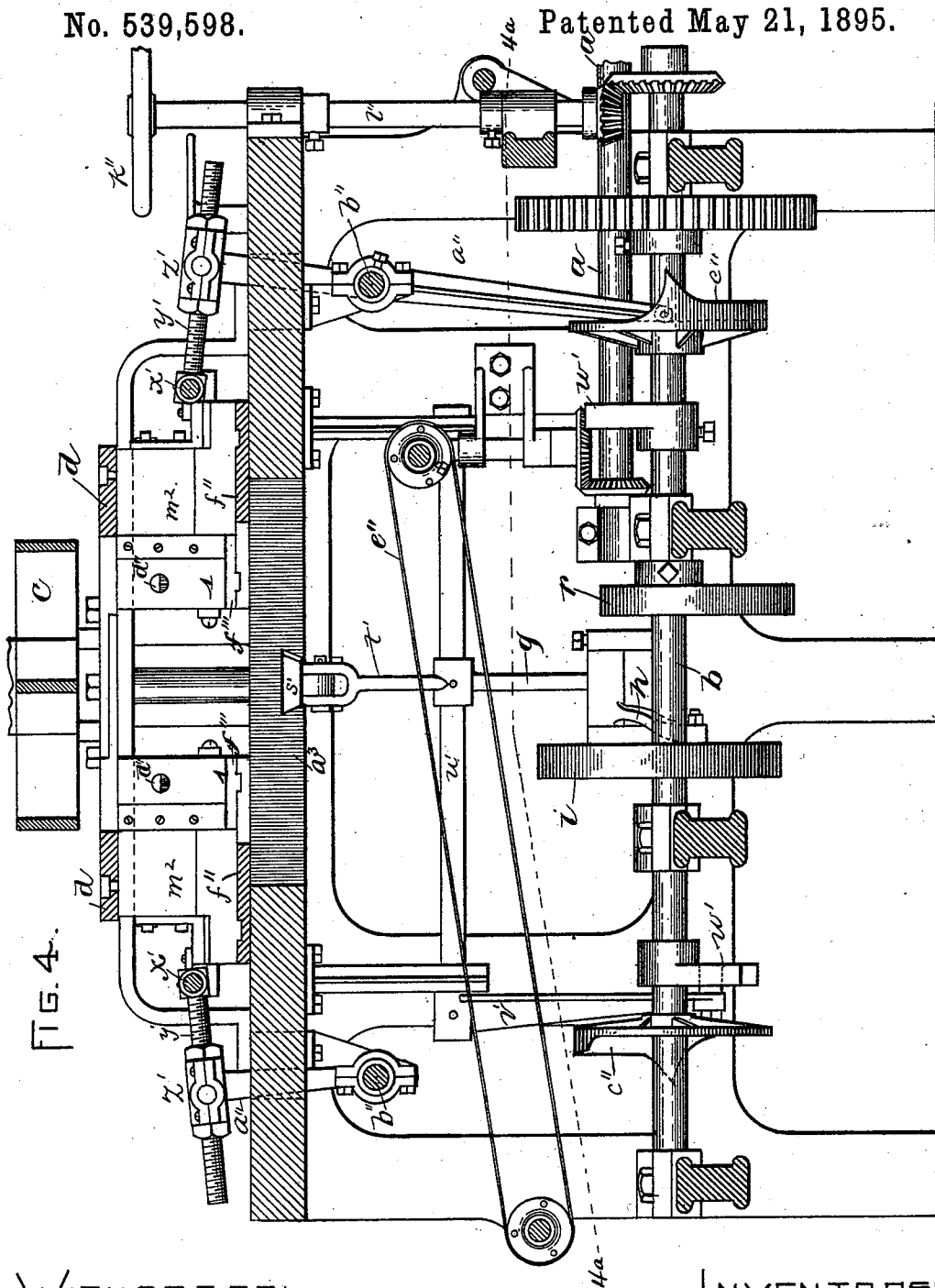
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Patented May 21, 1895.



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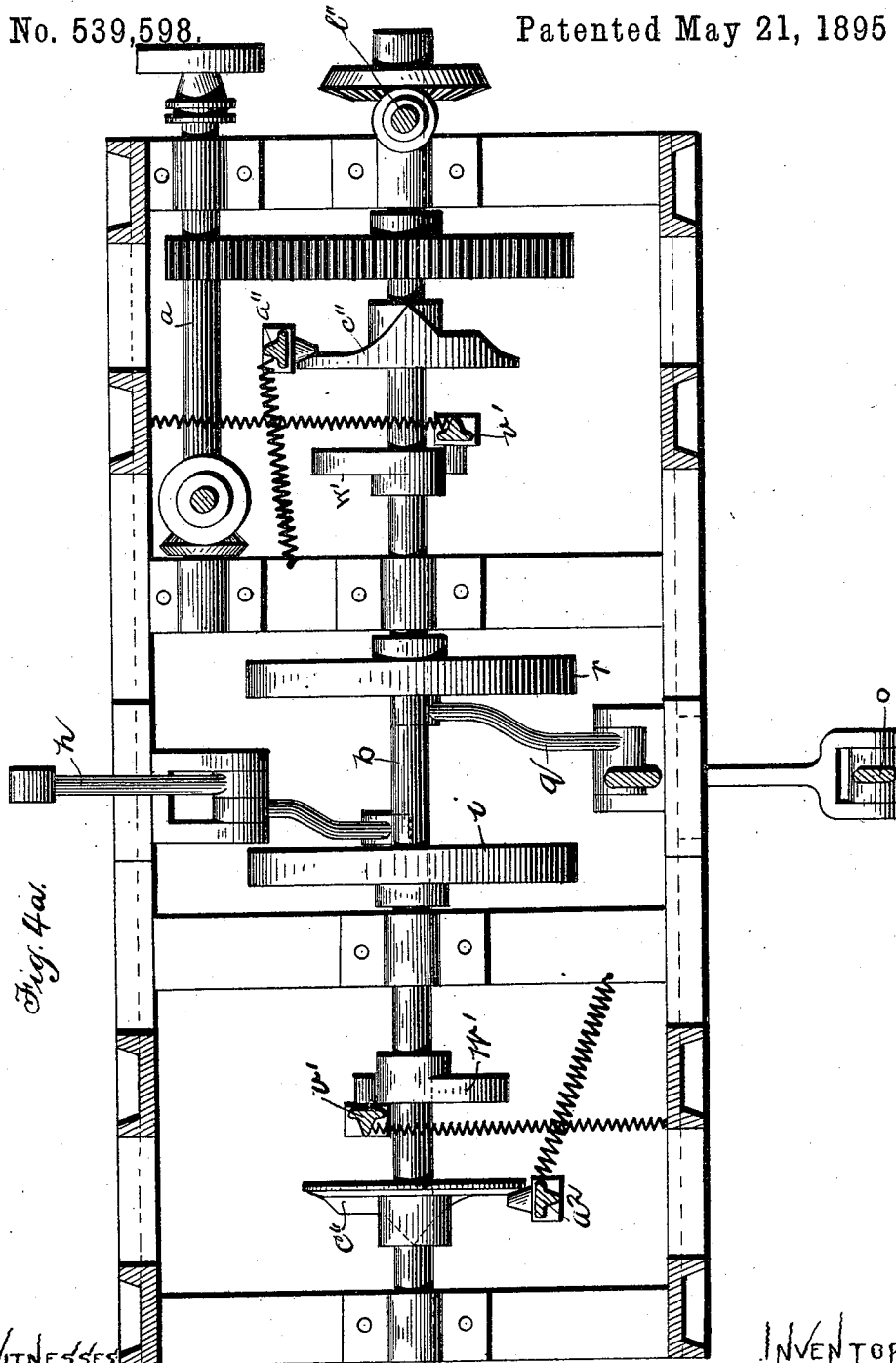
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WITNESSES

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BY THEIR ATTORNEYS

INVENTORS

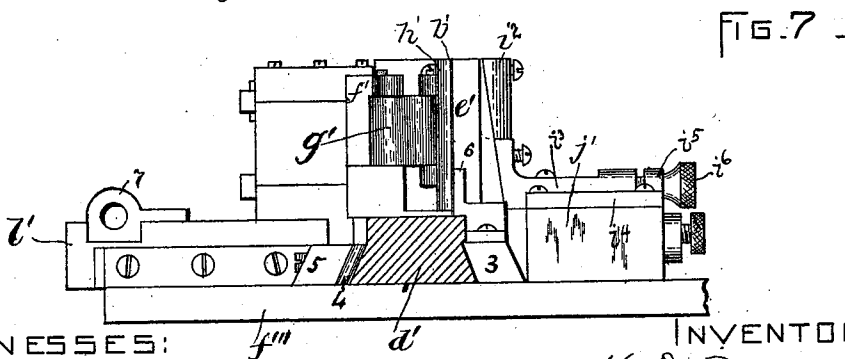
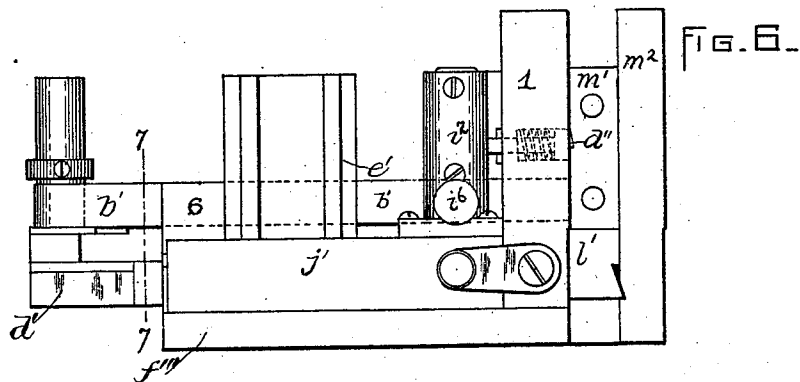
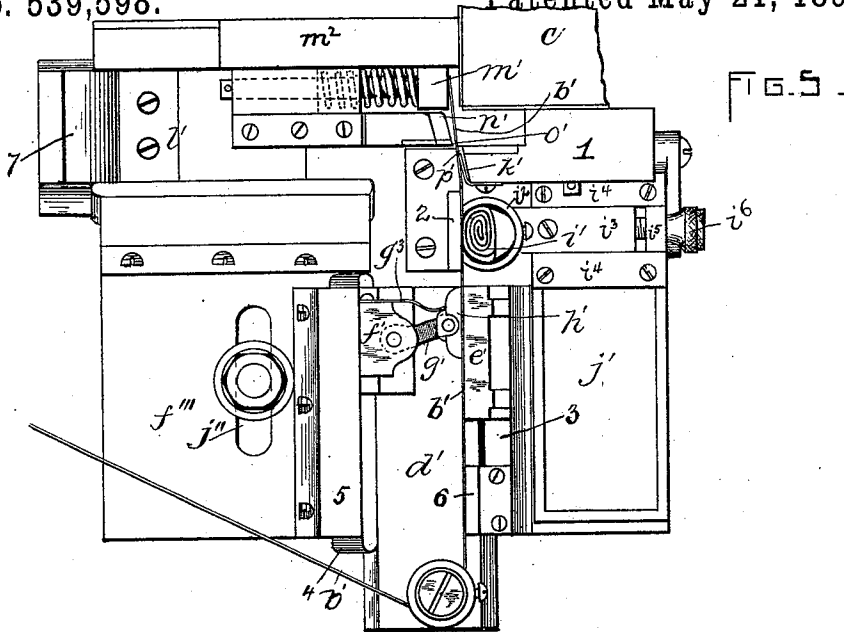
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9 Sheets—Sheet 7.

H. D. STONE & C. THIBODEAU
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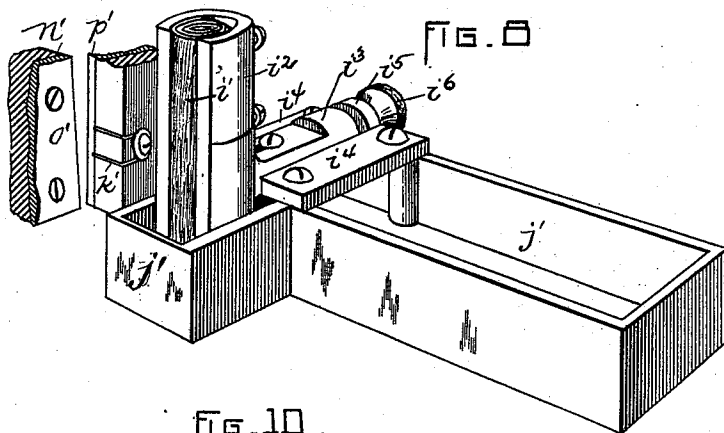


FIG. 10.

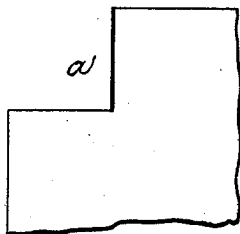


FIG. 11.

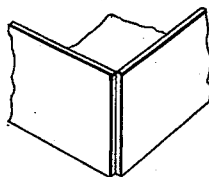


FIG. 12.

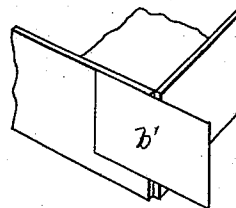


FIG. 13.

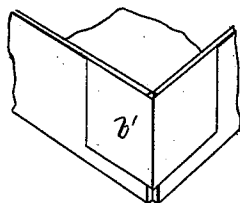
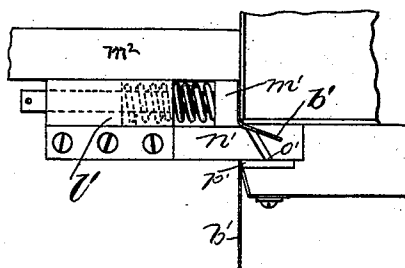


FIG. 9.



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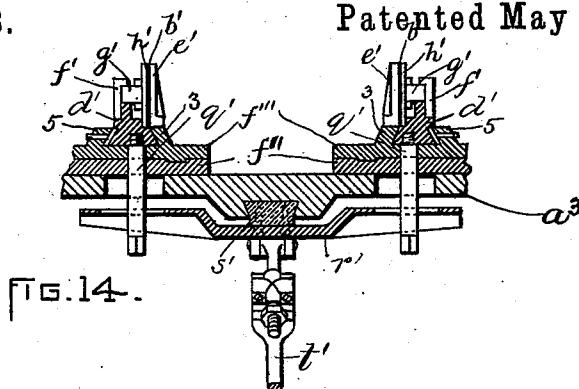


FIG. 15.

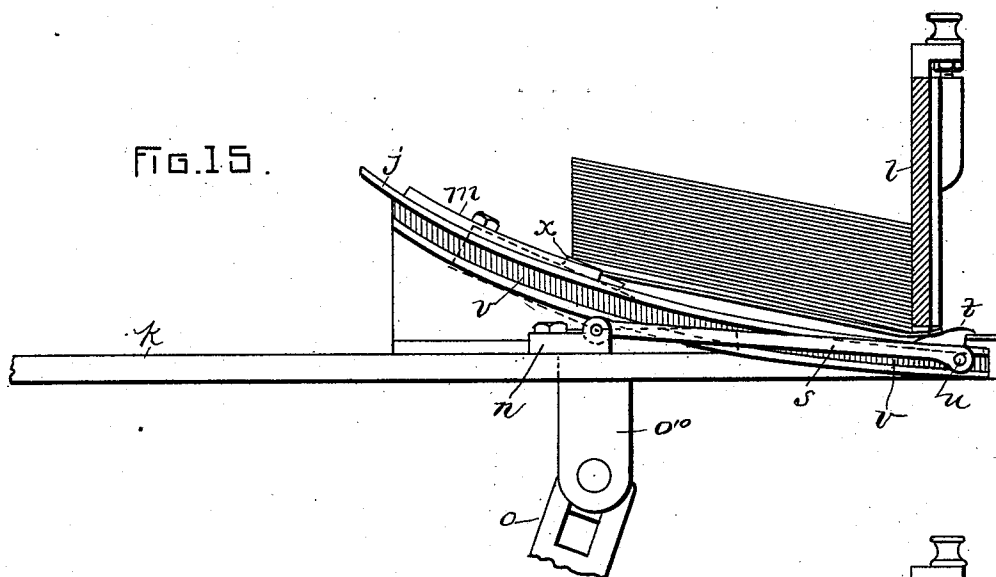
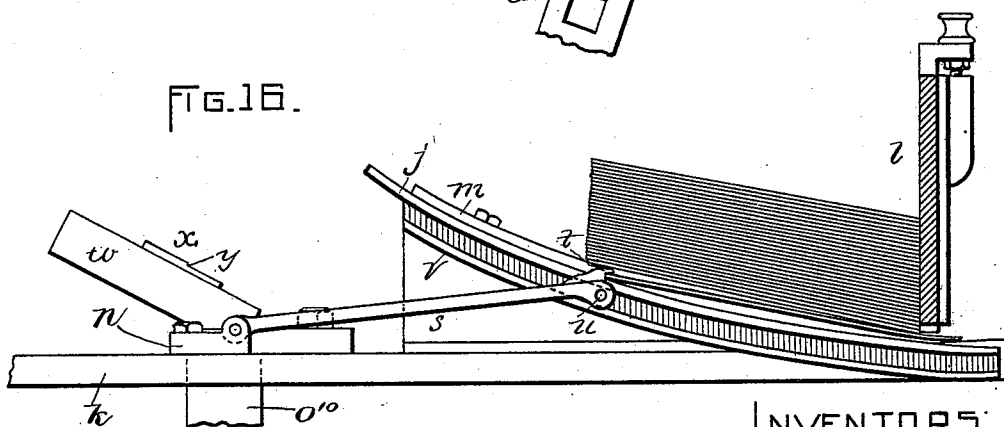


FIG. 16.



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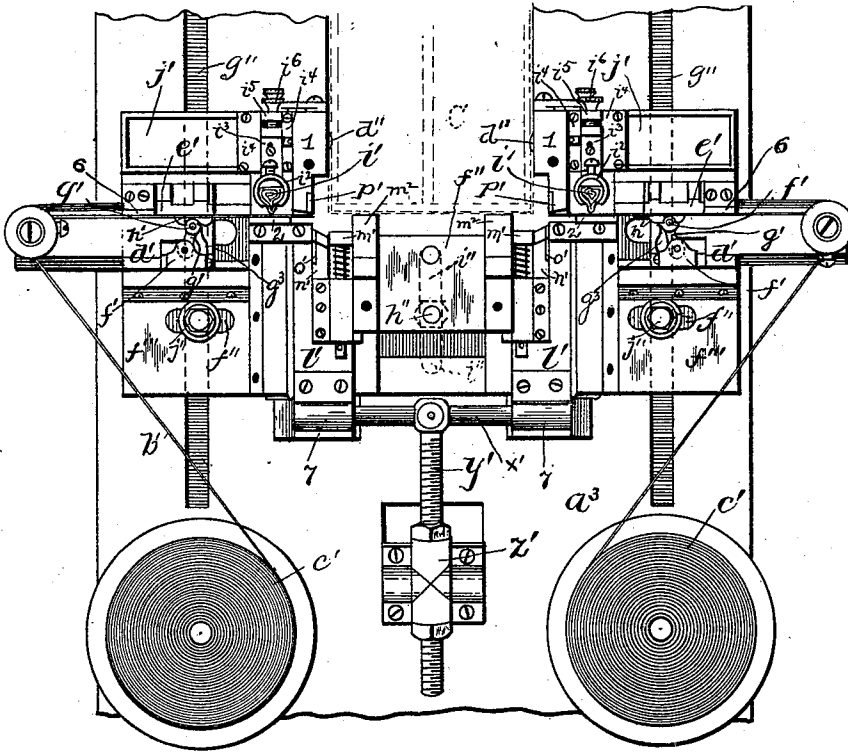
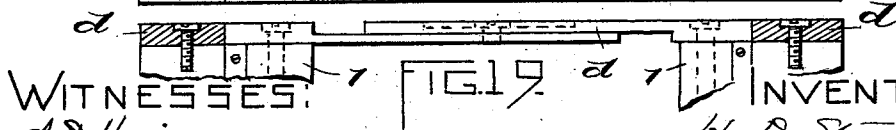
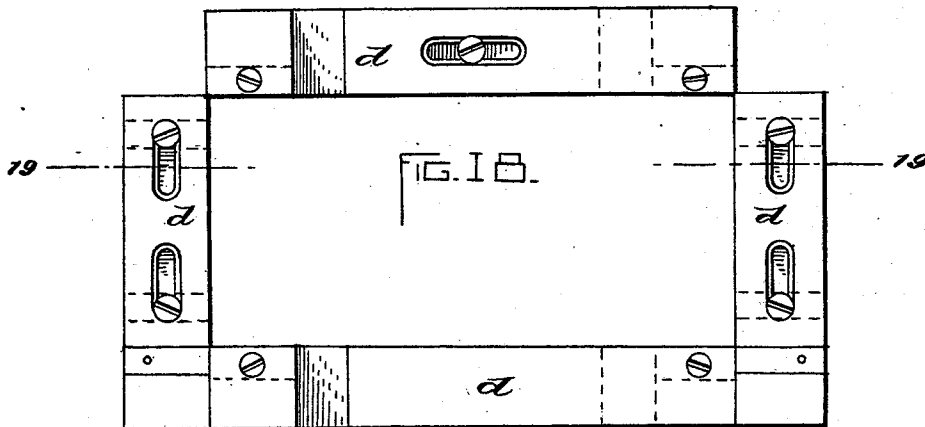


FIG. 17.



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UNITED STATES PATENT OFFICE.

HENRIE D. STONE, OF BOSTON, AND CHARLES THIBODEAU, OF SOMERVILLE,
ASSIGNORS TO JAMES S. NEWELL & CO., OF BOSTON, MASSACHUSETTS.

PAPER-BOX-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 539,598, dated May 21, 1895.

Application filed August 22, 1892. Serial No. 443,757. (No model.)

To all whom it may concern:

Be it known that we, HENRIE D. STONE, of Boston, in the county of Suffolk, and CHARLES THIBODEAU, of Somerville, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Paper-Box-Making Machines, of which the following is a specification.

This invention has relation to machines for making paper boxes by folding margins of a previously-prepared blank so as to form the sides and ends of the box, and pasting staying strips on the corners to hold the same together and maintain the parts in proper position.

It is the object of the invention to provide a machine of the kind mentioned which shall do its work rapidly, be simple in construction, and certain and efficient in operation.

To these ends the invention consists of the improved parts and groups of parts which we will proceed to describe and claim.

Reference is to be had to the annexed drawings, and to the letters and figures of reference marked thereon, forming a part of this specification, similar letters and figures designating similar parts or features, as the case may be, wherever they occur.

Of the drawings, Figure 1 is a top plan view of the improved machine complete. Fig. 2 is a front view of the same. Fig. 3 is a side or end view of the same. Fig. 4 is a longitudinal vertical sectional view of the machine on line 4 4 of Fig. 3, looking toward the right in said figure. Fig. 4^a is a horizontal section on line 4^a 4^a of Fig. 4. Figs. 5, 6, and 7 are respectively top plan, inner side or end, and front views of the group of parts employed in feeding, moistening, cutting off, and pasting on the corner-staying piece or strip, Fig. 7 showing the slide *d'* as in section on line 7 7 of Fig. 6. Fig. 8 is a perspective view of the device for moistening the gummed face of the staying-strip. Fig. 9 is a top plan view of the means for cutting off and pasting on the staying-strips. Figs. 10, 11, 12, and 13 are diagrams illustrating the steps followed in the process of forming the corner of a box or box-lid. Fig. 14 is a detail view on a reduced scale, showing the means for operating the devices for feeding in the staying-strip, said

figure being partly in section to show operating connections. Figs. 15 and 16 are side views illustrating the means employed for feeding blanks under the plunger to be formed into boxes, the abutting plate being shown in section. Fig. 17 is a detail plan view showing how certain parts may be adjusted to suit the machine to making boxes of varying size. Fig. 18 is a detail plan view of the gage plates. Fig. 19 is a section on line 19 19 of Fig. 18, showing also the upper ends of the plates 1 and abutments *m*².

In the drawings *a* designates the driving shaft which is provided with a driving pulley and a clutch mechanism for stopping and starting the machine. The said driving shaft is geared with the cam shaft *b* having suitable bearings connected with the frame, and extending longitudinally thereof.

c designates a plunger or former adapted to be reciprocated vertically and in connection with the gage plates *d* fold a blank fed thereunder into the form of a box or box lid.

To prevent the outward springing of the sides of the box or lid after it is pressed below plates *d*, we provide vertical plates 1 below the plates *d*. See Fig. 4. These gage plates *d* are mounted as follows: The side plates are each composed of two overlapping parts, as shown in Figs. 4, 18, and 19, adjustably secured together by a screw or bolt passed through a slot in one part, and the ends of the compound gage plate thus formed are secured to the tops of the vertical plates 1. The end gage plates are mounted on the upper ends of the abutments *m*² and are slotted so that the screws which attach them to said abutments may, when the latter are moved toward or from each other, move along said slots. To adjust the width of the opening between the gage plates, the side gage plates, with their supports, are adjusted toward or from each other, moving along the inner edge of the end plates; and to adjust the length of said opening the side plates are caused to overlap more or less and the end plates are moved toward or from each other to keep their inner edges close to the ends of the side plates.

The plates 1 may be supported in position in any suitable way, but preferably, they con-

sist of standards rising from and secured to the plates f''' hereinafter referred to.

The plunger or former c is raised and lowered by a lever e fulcrumed on the upright f , and pivoted at its inner end to the shaft of the plunger, and at its outer end to a weighted rod g , which at its lower end is pivotally connected with a lever h arranged to be acted upon by a cam i on the cam shaft.

j designates the feed bed supported upon the table k . The said bed consists of two slightly curved strips, inclined toward the center of the machine, of a form and construction adapting them to support a "bank" or pile of blanks with their forward edges resting against the abutting plates l and the rear edges of all excepting the bottom blank resting upon the adjustable blocks m , the lowest blank being moved forward so that its rear edge may rest against the forward edge of the said adjustable blocks. Space just sufficient for the easy passage therethrough of a blank is provided between the bed and bottom of the abutting plate l . This plate l is supported by screws l^0 , passing therethrough into uprights l^1 secured to the table k , as shown in Figs. 1 and 2.

n designates the feed slide or carriage supported on ways formed in the table, and having studs o^{10} connected with the upper end of a lever o which is operatively connected, through the medium of a link rod p with a lever q which at its inner end is acted upon by a cam r on the cam shaft, so that the slide n may be reciprocated on the table.

Pivotally connected at their outer ends with the slide n are the feeding arms s , the inner ends of which are provided with the fingers t . A stud u (see Figs. 15 and 16) projects laterally from the inner ends of the arms s and extends into a groove v formed in the outer edges or sides of the feed bed, whereby the fingers on the feed arms are accurately guided in their movements.

Centrally located on the slide n is an inclined block w , provided on its face with a plate x having an offset y . (See Figs. 3 and 16.)

In the operation of the machine, supposing a pile of blanks to be in position, as shown in Figs. 3, 15 and 16, as the slide moves forward the fingers t will engage the rear edge of the bottom blank (see Fig. 16) and move the same inward under the plunger or former c . Just before the slide reaches the limit of its inward movement the offset y of the plate x on the block w will engage the rear edge of the bottom blank of the pile and move it inward a distance sufficient to allow the rear edge to drop off the plates m , and so rest in a lower plane than it otherwise would, as shown most clearly in Fig. 16 in order that the fingers t may engage it readily and with certainty when they next move inward. The plate x thus forms an auxiliary feeder, and in order that different sizes of blanks may be fed said plate is adjustable on the block w , (see Fig. 1), by means of the bolt x^{10} , passed through a

slot w^{10} in the said block w . The bolt x^{10} is provided with a nut x^{11} , (see Fig. 2,) on the under side of the block w . The table k is slotted, as shown, in order to enable the slide and its adjuncts to be operated by the means beneath the same. The inner end of the link rod p is tapped into a nut z which practically forms a part of said link rod. The said nut is provided with a hand wheel z^3 or other means for turning it so as to adjust the link rod as to length. The outer end of the link rod at its point of pivotal connection with the lever o is adjustable by means of a slot z^4 , (see Fig. 3) in said lever longitudinally of the latter. These provisions for adjustment are made in order to suit feeding means to blanks of varying size, so that different sized boxes may be made on a single machine. The blanks are notched as at a' (see Fig. 10) where the corners of the box are to be formed, in order that when the sides and ends are turned up, the edges of the notched part will meet, as shown in Fig. 11. After a blank has been fed under the plunger or former, the latter will descend through the space between the gage plates d upon which the edges of the blank rested, carrying the center of the blank with it and causing the sides and ends to be turned up by the gage plates d , which "iron" them, as it were up against the sides and ends of the former or plunger, to the form shown in Fig. 11. The end of a staying strip b' leading from a roll or spool c' (see Fig. 17) will next be fed inward at each corner, so as to overlap the end of the box, as shown in Figs. 5, 9 and 12. During the application of the stay strip to the corners of the formed blank, by the means hereinafter described, the sides of said formed blank are held in vertical position by the plates l above described. The ends of the formed blank are held by the abutments m^2 (see Figs. 5, 9 and 17), which are suitably supported by the side guides for the slide l' , and adjoining which the bunters m' slide, as hereinafter referred to. Any suitable means for feeding the strip inward may be employed. As herein shown the feeding means consist of a slide d' , (see Figs. 5, 6 and 7) provided with a vertically arranged bearing plate or block e' . This slide d' has beveled sides fitting between a strip 3 secured to the plate f''' and a wear strip 4 held in place by another strip 5. Above the front end of the strip 3 is secured a vertical plate 6, against which the staying strip b' is drawn and thereby prevented from "buckling." The block e' is permanently secured to the front end of the slide d' and above the plane of the strip 3. In Fig. 5, the slide d' with its shoe h' and the plate e' is in its advanced position and the space indicated between the plate e' and the plate 6 indicates the extent to which the slide d' may be withdrawn preparatory to another feed of the staying strip b' . The slide d' is further provided with a lug f' in which is pivoted one end of a link g' the other end of which is swiveled or pivoted upon a shoe h'

which is adapted to bear against the plate e' . (See Fig. 5.) The pivotal points at the ends of the link g' are "off center," and a spring g^3 is arranged to bear against the inner portion of the shoe and press the latter against the staying strip b' which passes between it and the plate e' . The slide d' carries the plate e' as well as the shoe h' and during the advance of said slide, the strip b' is fed forward, owing to its being clamped between said shoe and plate e' . On the retreat of the slide, the spring g^3 permits the shoe to yield sufficiently so that it and the plate e' may move backward without carrying back the strip. This construction is provided so that when the slide moves inward it may carry the strip inward with it, and so that the strip may be drawn forward by the shoe.

It should be mentioned that the inner side of the staying strip is gummed, and that this gummed surface is moistened after it passes the shoe h' . The moistening can be effected in any suitable way. As herein shown the moistening is accomplished by bringing the gummed surface into contact with a piece of chamois or any suitable material i' , one end of which rests in a trough j' (see Fig. 8) containing water. To hold the strip b' in contact with the material i' a vertical plate 2 is secured to the body of the machine, opposite the said material i' , as shown in Figs. 5 and 17. The portion of the piece of felt with which the strip comes into contact is kept sufficiently wet by capillary attraction. The piece of absorbent material i' is contained in a casing i^2 having cylindrical form, open on one side and held vertically with its lower end and the lower portion of the absorbent material in the trough j' . This casing i^2 is preferably adjustable toward and from the plate 2. As indicated in Figs. 5 and 8, the casing i^2 is mounted on the front end of the slide i^3 fitted between guides i^4 located over a portion of the trough j' . An adjusting screw i^6 passes through a lug i^5 formed on the edge of the trough j' , and extends into the slide i^3 to adjust the latter and the casing i^2 .

k' designates a wire provided for the purpose of bearing the dampened gummed surface off from contact with any part to which it might adhere and prevent it from being moved inward.

l' designates slides, one at each corner of the plunger or former, each of which last-mentioned slides is adapted to move on a line at a right angle to the line of movement of the slide d' . The slide l' is equipped with a spring pressed bunter m' adapted to be brought to bear against the portion of staying-strip overlapping the end of the box, and press and paste the same thereagainst; and the last mentioned slide is further provided with a pasting down piece n' on the outer forward edge of which is a knife o' adapted to co-operate in a shear cut, with a knife p' on a stationary part of the machine, as is clearly shown in Figs. 5, 8 and 9.

After the sides and ends of a blank have

been turned up, as hereinbefore explained, to form a box the slides d' will be moved inward so as to feed in the desired amount of staying strip, as shown clearly in Figs. 5 and 12. Each slide l' will next be advanced so as to bring the bunter m' to bear against the strip and press it against the end of the box, holding it while the slide d' moves back allowing the strip to slip between the shoe h' and bearing plate e' . The slide l' will now move farther inward, the bunter m' yielding to permit of this operation, the knives severing the strip at the desired point and the pasting down piece, n' "ironing" and pasting down the severed end of the strip against the side of the box as will be understood without further description by reference to Figs. 9 and 13.

Motion is imparted to the slides d' by pins q' which extend down through slots in the supporting frame or bed a^3 into slots of a bar r' connected with a slide bar s' dovetailed into the bed, (see Fig. 14) which slide bar is moved by means of a lever t' connected to a rock shaft u' which is operated by levers v' which are acted upon by tappets w' on the cam shaft. (See Fig. 4.) The two pairs of slides d' are located on opposite sides of the machine and their levers t' v' extend down on opposite sides, as shown in Fig. 3, to be operated upon by the tappets w' which project from opposite sides of the shaft b as shown in Figs. 4^a and 4^b. Fig. 4 shows but one lever t' , rock shaft u' and lever v' for the reason that the duplicate construction operated by the right hand tappet w' is cut away by the line of section.

The slides l' are moved by a bar x' connected with the pair at each end of the machine, (see Figs. 1 and 4) with which bar the inner end of a screw threaded rod y' is connected, said rod being tapped through a block z' on the upper end of a lever a'' , fulcrumed on a shaft b'' , the lower end of the lever a'' being acted upon by a cam c'' on the cam shaft.

In Fig. 4 the lower end of one of the levers a'' is omitted for the reason that said lower end of the lever would not appear in a section on the line upon which this figure is drawn. Referring to Fig. 4^a, in connection with Fig. 4, it will be understood why said lower end of the lever does not appear in Fig. 4.

On the rear end of each slide l' is secured a sleeve 7 to receive the end of bar x' , the object of this sleeve connection being to retain operative connection with said bar x' when the plates carrying the slides l' are adjusted toward and from each other by the means hereinafter described, to suit the same for different sizes of boxes being made.

The rod y' is connected with the block z' as described in order that it may be adjusted to suit the machine to the making of boxes of different size.

When a blank is pressed down by the plunger or former to form a box, it will be pushed

down so that its upper edge will pass the inclined spring-pressed catch d'' , (Figs. 4 and 6) and so that when the plunger rises said catch will hold the formed box against rising with the plunger, and allow it to remain in place for the paste to set, when upon the descent of the next formed blank it will be pushed down and ejected upon the apron e'' driven from the driving shaft, as shown, and be carried away thereby.

The slides d' and l' and their adjuncts at each corner of the plunger are supported upon a plate f''' (see Figs. 14 and 17), and the two plates f''' on each end of the machine are supported upon the plate f'' (see Fig. 17) extending across the end of the machine so that by moving said plate inward or outward the said slides and their connected parts may be likewise moved. This adjustment is provided for in order that the parts of the machine may be adapted to the making of boxes of varying size. On the lower face of the plate f'' are ribs (not shown) corrugated or otherwise constructed to engage the corrugations in the bottoms of the grooves g'' formed in the bed of the machine, so that when the plate f'' is moved to desired position it may be bolted down and held in place by the bolt h'' passing through the slot i'' formed in the bed of the machine. (See Fig. 17.) The slides d' and l' with their plates f''' are adjusted at right angles to the adjustment just described by bolt and slot connections with the plate f'' , as indicated at j'' , Fig. 17.

k'' designates a hand wheel on a vertical shaft l'' which is geared with the cam shaft, whereby the machine may be operated by hand when necessary.

By the means described we are enabled to form a box or box lid and stay all of the corners of the same at a single operation, and to perform this work accurately, efficiently and rapidly.

Some details of construction, which relate to minor adjustments and connections, which are mere shop expedients, are not described, for the reason that the same form no part of our invention and will be readily understood by those skilled in the art, from the drawings only.

Having thus explained the nature of the invention and described a way of constructing and using the same, though without attempting to set forth all the forms in which it may

be made or all of its modes of use, we declare that what we claim is—

1. Means for feeding blanks to the plunger or former of a box making machine comprising in its construction a bed provided with a gage plate or block supporting one side of the pile of blanks, a slide provided with a plate having an offset for engaging the bottom blank and moving it off the gage plate to permit it to drop a short distance, and devices connected with the slide for engaging the blank and feeding it forward, as set forth.

2. Means for feeding blanks to the plunger or former of a box-making machine comprising in its construction a slide, devices connected therewith for engaging a blank and feeding it forward, a lever connected with the slide, an extensibly adjustable link rod adjustably connected with said lever, a second lever to which said link rod is connected, and a cam for operating the last mentioned lever, as set forth.

3. A machine for making paper boxes, comprising in its construction a former, a movable staying-strip feeding-device, and a movable cutting and pasting device at each corner of the former, as set forth.

4. A machine for making paper boxes, comprising in its construction a former, a movable staying-strip feeding device, a staying-strip moistening device—as a piece of moistened or wet felt—or other suitable material, a movable cutting and pasting device at each corner of the former, and a spring mounted presser carried by the cutting and pasting device for pressing the moistened strip on the box as set forth.

5. Means for feeding a staying strip in paper-box making machines, comprising in its construction a movable slide, provided with a vertically arranged bearing plate, and a spring pressed shoe pivoted “out of center” on said slide and arranged to bear on the plate and hold the strip between the same and the plate, as set forth.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 9th day of July, A. D. 1892.

HENRIE D. STONE.
CHARLES THIBODEAU.

Witnesses:

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