2 Sheets—Sheet 1.

R. GRIMM.

PAPER BOX-MACHINE.

No. 171,476. Patented Dec. 28, 1875.

Fig: 1

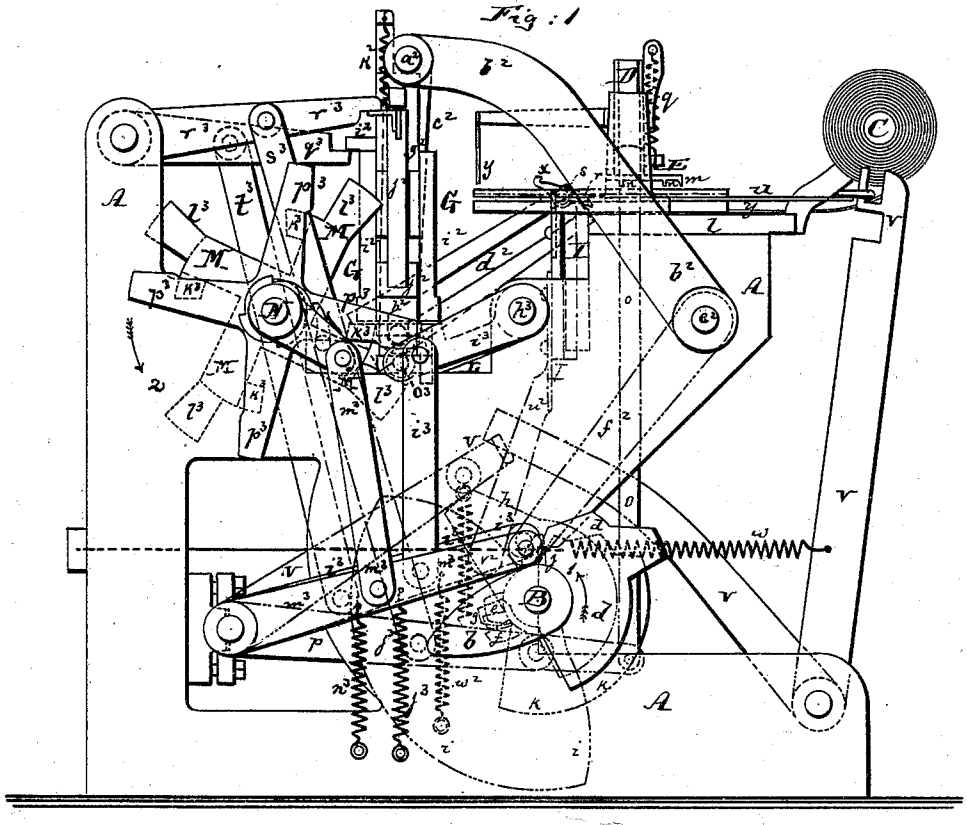
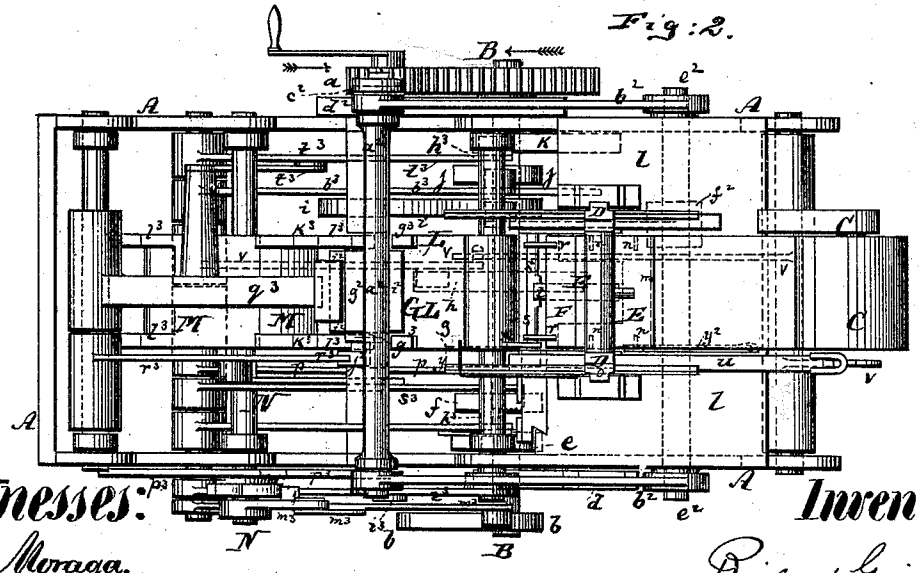


Fig: 2.



Witnesses:

A. Moraga.

Ernest C. Webb.

Inventor:

Richard Grimm

by his attorney

A. v. Briesen

2 Sheets—Sheet 2.

R. GRIMM.

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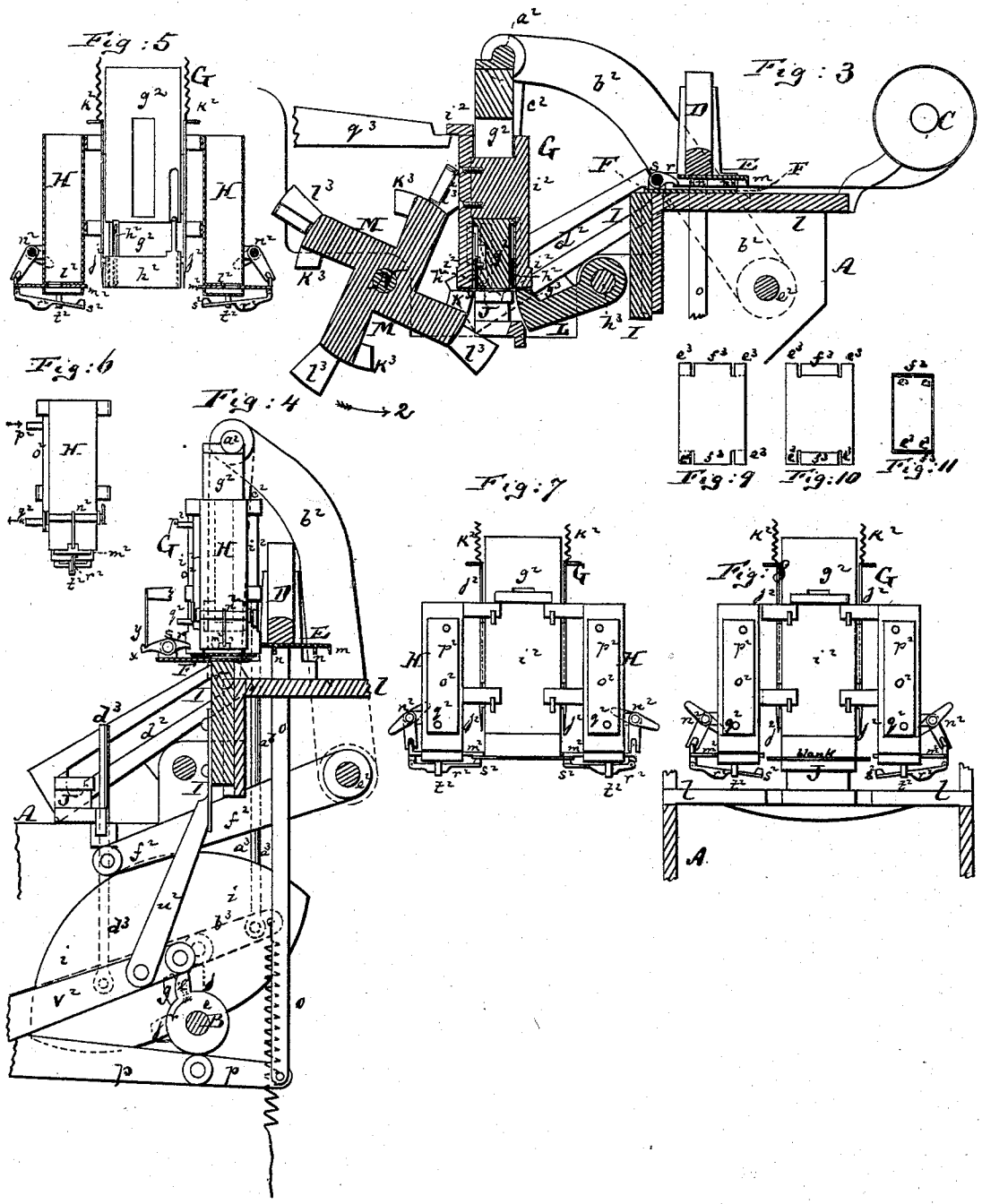

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A. v. Briesen

UNITED STATES PATENT OFFICE.

RICHARD GRIMM, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF AND HENRY MEYER, OF SAME PLACE.

IMPROVEMENT IN PAPER-BOX MACHINES.

Specification forming part of Letters Patent No. **171,476**, dated December 28, 1875; application filed August 30, 1875.

To all whom it may concern:

Be it known that I, RICHARD GRIMM, of New York city, in the county and State of New York, have invented a new and Improved Machine for Making Paper Boxes, of which the following is a specification:

This invention relates to a new machine for automatically producing from a roll or strip of paper or pasteboard rectangular boxes, such as are used for containing matches, and for other purposes.

The invention consists in various improvements of mechanism for automatically feeding, cutting, conveying, and folding the paper, applying the gum thereto, and discharging the completed boxes, all as hereinafter more fully described.

The principal features of invention are contained in the new construction of a device by which the paper, after it has been cut, is conveyed to the folding mechanism, and finally discharged from the conveying-tool, and also in the new construction of glue or gum boxes, in which the glue applied to the paper is contained, and wherein it is maintained in a soft condition, and from which it is taken at certain intervals, as occasion requires, to be applied to the paper, the whole mechanism being entirely automatic.

In the accompanying drawings, Figure 1 represents a side elevation, and Fig. 2 a top view, of my improved machine, these two figures representing the machine without the glue-boxes, which would otherwise hide other mechanism necessary to show. Fig. 3 is a vertical longitudinal section through the cutting, feeding, conveying, and folding part of the machine. Fig. 4 is a side view, partly in section, of the cutting and conveying mechanism, showing the glue-box attached to the latter. Fig. 5 is a face view of the conveying mechanism, showing two glue-boxes attached to the opposite sides of the same, said glue-boxes being shown in section. Fig. 6 is a side view of one of the glue-boxes. Fig. 7 is a face view of the conveying-tool with the glue-boxes therein. Fig. 8 is a similar view, showing the gumming-blades or wipers and the clamp of the glue-boxes in a different position from that in which they are shown in Fig. 7. Fig. 9 is a face view of the paper blank after it has been cut and punched by the machine. Fig. 10 is a similar view thereof, showing it after it has been gummed and creased; and Fig. 11 is a top view of the complete box.

Similar letters of reference indicate corresponding parts in all the figures.

The letter A in the drawing represents the frame of the machine, made of metal, wood, or other material, of proper shape, size, and strength to enable it to sustain the working mechanism in position and to allow the proper operation of the parts. B is the driving-shaft, hung transversely in the lower part of the frame, and receiving rotary motion in the direction of the arrow 1 (shown in Fig. 1) by gearing-connection with a pinion, *a*, or by other suitable mechanism. This shaft carries a series of cams, *b d e f g h i j k*, which are used for imparting the requisite degree of motion to the several parts of the mechanism, as hereinafter specified. The said cams are all indicated in Fig. 2, and several of them are also represented by dotted lines in Fig. 1, and some in Fig. 4. *l* is a table, firmly attached to one end of the frame A. In front of this table is hung a drum or roll, C, upon which the paper or pasteboard from which the boxes are to be made is wound; but, in place of a drum or roll, long strips of paper or pasteboard not rolled up may be employed. Above this table *l* is suspended, from a vertical slide, D, the cutter E, which is made in form of a horizontal plate or frame, the front edge of which carries a pendent cutting-blade, *m*, while behind said blade there are two pairs of straight cutting or punching ribs, *n n*, which are all parallel with the cutting-blade *m*, but considerably shorter than the same, as indicated by dotted lines in Fig. 2. The slide D is, by a vertical rod, *o*, connected with a lever, *p*, to which, by the cam *g*, the requisite downward motion is imparted, a spring, *q*, serving to raise the slide D after the cam *g* ceases to act upon the lever *p*. Thus reciprocating motion is imparted to the slide D and cutter E once during every revolution of the driving-shaft B, and the cutter caused at each descent to detach

from the end of the roll of paper a piece of the size required for forming a box, (the shape of the blank being indicated in Fig. 9,) said piece of paper or blank being also provided at each end with two incisions, (shown in Fig. 9,) which determine the extent of the longitudinal folds to be produced on the blank, and also the extent of the transverse folds, the depth of each incision determining the distance of the transverse fold from the end of the blank, while the longitudinal fold is determined by the distance of the incision from the side edges of the blank After the cutter has detached a blank of the style shown in Fig. 9, and provided the same with the requisite incisions, said blank is taken hold of by a horizontal reciprocating carrier, F, which, at its rear end—being the end which is farthest away from the roll C—carries a rock-shaft, *s*, with two projecting claws, *r r*. (See Fig. 3.) A spring, *t*, bears on a cam portion of the rock-shaft *s*, so as to crowd the claws *r r* upon the rear end of the blank, and thereby confine the blank to the slide or carrier F—that is to say, before the cutter E is brought down to detach and cut the blank the flat plate portion of the carrier F is placed on the table *l*, beneath the rear part of the cutter E, as in Fig. 3, the claws *r r* meanwhile fastening the rear end of the paper slip down upon the flat plate portion of the carrier.

After the cutter has detached the blank from the strip, the carrier F is moved backward to convey the blank away from beneath the cutter backwardly—that is to say, farther away from the roll C.

For the purpose of obtaining the requisite horizontally-reciprocating motion, the carrier F is, by a rod, *u*, connected with an elbow-lever, *v*, to which, by the cam *h* on the driving-shaft B, and by a spring, *w*, vibrating motion is imparted, the vibrating motion of the lever *v* being, by its action on the rod *u*, transformed into horizontal reciprocating motion of the carrier. After the carrier has been moved as far backward as possible a crank, *x*, on its shaft *s* is struck during a subsequent vertical motion of the carrier F, which will hereinafter be more fully described, by a fixed stop, *y*, and the rock-shaft *s* thereby so vibrated that its spring *t* will throw the claws *r r* off the blank, leaving the latter loose on the flat portion of the carrier, substantially as indicated in Fig. 4.

The blank is now in condition and position to be taken up by the conveying-tool G. This conveying-tool consists principally of a vertical block, g^2, rectangular in horizontal section, which block is suspended from a rock-shaft, a^2, that hangs in the upper ends of levers b^2, that are pivoted to the sides of the frame A. A crank, c^2, on the rock-shaft a^2 extends into an inclined slotted guide, d^2, that is fastened to the frame A, and serves, during the vibration of the levers b^2, to so swing the shaft a^2 that the block or body g^2 of the conveyer G, with all its appendages, will always remain in a vertical position, or nearly so. The pivot-bar e^2 of the levers b^2 has a projecting crank, f^2, which bears on the cam *i* of the shaft B, as in Fig. 4, so that by such cam *i* vibrating motion is imparted to the levers b^2, and by them to the conveying-tool G; but the latter is, during such motion, invariably held in a vertical position—that is to say, suspended vertically from and below the rock-shaft a^2, to which it is rigidly attached.

The central block or body g^2 of the conveyer has, as already stated, a horizontal section of rectangular form, the size of which is very near the size of the interior of the box to be produced, but slightly smaller than the same. The lower part of the block g^2 of the conveyer is embraced by a quadrangular sleeve, h^2, which sleeve has externally about the size and shape of the interior of the box to be produced, without necessary reference, however, to the height of such box.

For greater convenience of description, I will style those vertical sides of the conveyer which are parallel with the axis of the drum C the "faces" of the same, and those vertical sides thereof which are at right angles to the faces I will style the "sides" of the conveyer. On the two faces the conveyer carries two slides, i^2, which are connected with each other by a pin passing through a vertical slot on the block g^2, as in Fig. 3, and which, by their own weight, have the tendency to drop down, so that their lower ends will be flush with the lower end of the block g^2, as in Fig. 3; but these slides i^2 are capable of a vertical motion on the block, as hereinafter set forth. Each side of the conveyer carries also a slide, j^2, which two slides j^2 are represented in Fig. 5, they being both thin plates of metal, both bearing directly against, and being outside of, the ends of the sleeve h^2, so that thus, when the sleeve is in its downward position on the block g^2, and the slides i^2 j^2 are also in their downward position, said sleeve will be entirely embraced by the four sides i^2 i^2 and j^2 j^2. The length of each slide j^2, horizontally, is the same as the width of the sleeve h^2, and the length, horizontally, of each slide i^2 the same as the length of the sleeve h^2. Each slide j^2 is connected with a spring, k^2, which has the tendency to raise such slide j^2 to its greatest height on the convever, as and for the purpose hereinafter specified.

To each side of the conveyer is applied one of the two gum or glue boxes H H, which are suspended from pins that project from the faces of the slides i^2, so as to partake of the vertical motion of said slides, the two glue-boxes having the slides j^2, the sleeve h^2, and the block g^2 between them, as clearly indicated in Figs. 5, 7, and 8. Each glue-box H has a false bottom, l^2, and below the same a sliding wiper-blade, m^2, and below said wiper-blade a regular bottom, all as indicated in Fig. 5. Each wiper m^2 extends transversely through

the lower part of the glue-box, and is capable of being moved nearer to the slide h^2 or farther away from the same. The outermost end of each wiper is connected with a crank-shaft, n^2, that is hung on the outer side of the glue-box, so that when such crank-shaft is vibrated in one direction, the wiper will be moved inward—*i. e.*, toward the sleeve h^2; and if the crank-shaft is vibrated in the other direction, the wiper will be moved outward—*i. e.*, away from the sleeve h^2. When the wiper has been moved farthest outward, as in Fig. 5, a hole in it is directly beneath a hole in the false bottom l^2 of the glue-box, and the glue contained in the glue-box is, consequently, allowed to flow into the lower part of the same beneath the wiper, and thereby to come in contact with the lower surface of the inner end of the wiper. When, thereupon, the wiper is moved inward—that is, toward the sleeve h^2—the lower surface of that portion of it which then extends from the glue-box is coated with glue.

The contents of each glue-box are maintained in the proper liquid or semi-liquid condition by a steam-jacket, o^2, which is applied to each glue-box, as indicated in Fig. 6, and to which steam is conveyed through a pipe, p^2, such steam escaping through another pipe, q^2. To the outermost end of each wiper m is pivoted a rod, r^2, which at its front end, beneath the innermost end of the wiper, carries a transverse enlargement or clamp, s^2, the body of the rod r^2 passing through a loop, t^2, that is suspended from the lower end of the glue-box. An inclined edge is formed on the enlarged middle portion of the rod r^2 in such a way that when the wiper is moved inward, such inclined part of the rod will be raised in the loop t^2, and the clamp s^2 thereby swung up toward and near to the gummed lower surface on the inner end of the wiper, as in Fig. 7, while, when the wiper is moved outward, it will draw the inclined enlargement of the rod r^2 out of the loop t^2, and allow the clamp s^2 to drop away from the wiper, as indicated in Figs. 5 and 8. When the paper blank, as above described, has been drawn backward on the carrier F and released by the claws r r, the conveying-tool or conveyer G, with all its appurtenances hereinabove specified, is, on the levers b^2 and rock-shaft a^2, suspended directly above such blank, as indicated in Fig. 4, and in this position of parts the slides i^2, with the gum-boxes H, are by their own weight suspended as low on the conveying-block g^2 as possible, while the sleeve h^2 is also in its lowermost position around the block g^2, the slides j^2, however, being raised by their springs k^2 as far as they can be raised on the block g^2, as indicated in Fig. 7. The wipers of the glue-boxes are as yet drawn outward. At this stage of the operation a vertical slide, I, is raised from beneath against the carrier F, elevating it slightly, and with it the blank that rests on such carrier, so that the blank will be brought in contact with the lower surface of the conveying-tool. Vertical motion is imparted to the slide I by a rod, u^2, which connects with a lever, v^2, that is in contact with the cam e of the shaft B, the action of said cam being contrary to that of a spring, w^2, which tends to draw the slide I down.

Immediately after the slide I has raised the carrier F and the blank against the conveyer, cranks of the rock-shafts n^2 of the glue-boxes H are struck by vertically-ascending rods a^3, that connect with a lever, b^3, which is actuated by the cam j of shaft B, and by these rods a^3 the shafts n^2 are vibrated to slide the wipers inwardly over the middle portions of the ends of the blank. Thus the blank will, with its ends, come in contact with the glued lower surfaces of the inner ends of the two wipers, said glued lower surfaces being, by preference, roughened, so that they will retain the requisite quantity of glue. In this manner the blank is properly gummed, and also attached to the wipers, and by them held to the conveyer to be taken by the same to the folding mechanism, the gummed portion of the blank being that portion of each end of the blank which is between the incisions that are formed by the punches n n. Immediately after the blank has been brought by the elevated carrier against the conveyer and wipers, the clamps s^2 are swung up to confine the ends of the blank to the new position, as in Fig. 7. While the carrier F was elevated by the slide I, the crank x of the rock-shaft s was struck by the fixed stop y, so that the claws r were raised off the blank, as in Fig. 4, the spring t holding the shaft s, by frictional contact, in the new position thus imparted to it—that is to say, with the claws raised. After the blank has been attached to the conveyer in the manner described, the slide I is immediately drawn down by the spring w^2, and the carrier F thereby lowered away from the conveyer and from the blank, the next movement being a forward motion of the carrier F, which introduces its flat portion beneath the end of the paper strip, and finally takes hold of the end of said strip by means of the claws r r. This is effected by a fixed stop, y^2, which is fastened upon the table l, and strikes a crank on the rock-shaft s as soon as the carrier is brought farthest forward, and by so striking such crank causes the claws r r to snap down, under the action of the spring t, upon the paper, and to take hold of such paper and draw it with it during the subsequent backward movement of the carrier away from the roll C, until it has drawn it sufficiently below the cutter E that a new blank can be cut from it, whereupon the carrier stops for a short time to allow the cutting process to be performed, and then resumes its motion to take the new blank under the conveyer again, in the manner already described.

It is needless to state that the various horizontal movements and stops of the carrier F depend entirely upon a proper configuration

of the cam h, which is represented by dotted lines in Fig. 1.

Having now described the construction of that part of the machine by which the paper is fed under the cutter, cut, and the blank finally applied to the lower face or end of the conveyer, and gummed by the wipers of the glue-boxes, and having, in connection with the description of the apparatus, also described the mode of operation pertaining thereto, it only remains to describe the mechanism devised for properly folding the blank that is attached to the conveyer and the operation of folding. As already stated, the first movement after the parts arrive in the position represented in Fig. 4 is the lowering of the carrier F and its forward motion away from under the conveyer. The conveyer is then left free, with the blank attached to its lower face or end, and is then swung, by its levers b^2, upon a stationary die, J, which is rigidly attached to the frame of the machine, and which has a flat upper face about the size of the bottom of the paper box to be produced. The conveyer is vibrated or swung directly over and upon this die, so, in fact, that it will, with its whole weight, press the paper blank upon such die, the position of the conveyer, with reference to that of the die, being clearly indicated in Figs. 1 and 3. Into this position the conveyer arrives with its slides i^2 lowered down, the sleeve h^2 also lowered down, and the slides j^2 raised. Just as the conveyer reaches its position on the die a crank of each shaft n^2 is struck by a pin or vertical rod, d^3, that is raised by the action of the cam j and lever b^3 against such crank of the shaft n^2; and by such action of the lifting-rods d^3 the crank-shafts n^2 are vibrated, so as to draw the wipers m^2 outward, and with them the rods r^2 and their clamps s^2, the latter being at the same time lowered, as clearly indicated in Fig. 5. The blank now has its middle portion confined between the end of the conveyer-block g^2 and the die J, its sides being below the ends of the lowered slides l^2, but its ends free from contact on their upper as well as on their lower faces. These ends, as appears by reference to Fig. 9, consist each of three parts, e^3 f^3 e^3, separated by the incisions of the punches n n, the corner parts e being not gummed, while the middle parts f^3 of the ends of the blank are gummed on the upper faces, the limits of the applied gum being indicated in Fig. 10. In front of the die J is hung, on a cross-shaft of the frame, a vibrating folder, L, which has at its ends upwardly-projecting ears g^3, the inner faces of these ears being about as far apart from each other as the length of the box to be produced. To the rock-shaft h^3, on which the folder L is mounted, is imparted the requisite oscillating motion by a series of jointed rods or levers, i^3, and by the cam d, a spring, j^3, holding the appropriate link of the levers i^3 in proper contact with said cam, and tending to lower the folder L, while the cam d has the tendency at proper intervals to raise or swing up the folder L.

M is another folder, mounted upon a rotary shaft, N, that is hung transversely in the frame of the machine. The folder M is on the back of the die—that is to say, on the side opposite to that on which the folder L is applied. The rotary folder M is made in shape of a cross in section, as in Fig. 3, with four, more or less, projecting arms, each of which arms constitutes a folder of substantially the same construction and size as the folder L, and each having upwardly-projecting ears k^3, as far apart from each other as the ears g^3 are on L, and each having also horizontally-projecting ears l^3, that stand at right angles to the ears k^3, but are the same distance apart from each other as the latter. If the rotary folder were revolved the end of each of its four, more or less, arms would just clear the rear face of the die J and of the sleeve h^2. Its ears k^3 would just straddle the lower part of the rear slide i^2, and the ears l^3 would just straddle the die J, the lower part of the block g^2, with its box h^2, and slides j^2. If the folder L were revolved its end would just about graze the face of the box h^2, while its ears g^3 would straddle the front slide i^2. Of course the folder M may be placed in front, and the folder L in rear, of the die, if desired. Intermittent rotary motion is imparted to the folder M by the cam b acting on jointed levers m^3, that connect with the shaft N, a spring, n^3, serving to hold the levers m^3 in proper contact with the cam b. One of the jointed levers i^3 on the rock-shaft h^3 has also a projecting pin, o^3, (dotted in Fig. 1,) which comes at proper intervals in contact with the arms of a cross, p^3, that is mounted upon the shaft N, as indicated in Fig. 1.

The first motion toward folding the box is produced by an upward vibration from the position shown in Fig. 3 of the folders L M, whereby the ears g^3 and k^3 are brought under and against the corner flaps e^3 of the paper blank, swinging said flaps up into vertical position, the lines of folding being indicated by dotted lines in Fig. 9. The vibrating motion necessary for this action is not considerable in the folders, and is produced on the folder L by a step of the cam d, and on the folder M by the pin o^3 touching the cross p^3, and giving it a slight upward vibration. At the same time, about, that the corner flaps e^3 of the blank are thus folded up, the slides i^2 of the conveyer are raised out of the way of the folders that are to follow the motion above described.

The elevation of the slides i^2 is produced by a lever, q^3, which is swung up by proper rod-connection t^3 with the cam k. After the lapels e^3 of the blank have been folded up, and after the slides i^2 have been raised, the sides of the box are formed by folding up the sides of the blank at right angles to the middle part of the blank proper, and by thus folding the

sides of the blank into vertical position the corner lapels e^3 are brought vertically over the inner ends of the gummed lapels f^3 at the ends of the blank. This vertical folding of the sides of the blank is obtained by a further upward motion of each folder L and M, each folder with its end wiping one side of the blank up against its corresponding side of the box or sleeve h^2. Immediately after this process of folding the sides of the blank is carried into effect, or about at the same time, the end slides j^2 are moved downward, being crowded down by levers r^3, that derive their motion by rods s^3 from the cam f, the effect of the lowering of the slides j^3 being to confine the folded end lapels or corner lapels e^3 between the ends of the sleeve or box h^2 and the slides j^2. In Fig. 2 but one lever, r^3, is shown; but in practice two will be used, or one with two arms, one for each slide j^2. The said corner lapels e^3 are, by the slides j^2, held properly against the ends of the box h^2, and prevented from swinging outward. The folding process is now completed by a further upward motion of the folder M, which carries its ears l^3 against the ears f^3 of the blank, and folds these ends up against the corner lapels e^3, and just as gradually as the end lapels f^3 are swung up the slides j^2 are also drawn up to permit the raised end lapels f^3 to come into bodily contact with the corner lapels e^3 and produce the completed box, which is shown in Fig. 11. The gum on the upper faces of the end lapels f^3 will cause the same to adhere to the corner lapels e^3, and thus confine the parts in the proper position. The folder M now remains stationary with the complete paper box between its wings or ears l^3, and the next thing necessary is to discharge the box from the conveyer G, and at the same time to retain it between the wings l^3 of the folder M. This discharge of the box from the conveyer is chiefly effected by the elevation of the sleeve h^2 on the block g^2 to such an extent that such sleeve will be entirely withdrawn from within the paper box. The requisite motion is imparted to the sleeve by the continued, or rather resumed, upward motion of the slides i^2.

A pin—which projects from the sleeve h^2 into a groove of one of the slides i^2, and which is indicated in Fig. 3—is taken hold of, at the proper time, by the ascending slide i^2, and the sleeve thereby elevated with such slide, being raised out of the paper box. This paper box is meanwhile, by the continued pressure of the block g^2 upon the bottom of such paper box, retained on the die J; but the sleeve h^2 loosens the paper box from or on the conveyer, so that when, thereupon, the conveyer is swung up by the levers b^2 it will leave the paper box on the die J, between the ears l^3 of the folder M. After the conveyer has been raised off the die, as it is about moving into the position shown in Fig. 4 to take a new blank, the folder M receives about a quarter turn in the direction of the arrow 2, (shown in Figs. 1 and 3,) and is thereby caused to take the paper box last formed, and which it holds between its ears l^3, with it out of the way of the die, and out of the way of the conveyer, when next it descends, and thus the folder M, if it has four arms, is in condition to hold three completed boxes, and form a fourth before one of the completed boxes need be taken from it, which may be done by automatic process or by hand. Being thus held in the rotating folder M, the boxes have time to become dry, so that, upon their final removal from the machine, there will be no danger of separation of the ends f^3 from the corner lapels e^3 of the paper box.

The die J may, on its upper surface, be provided with suitable type and inking mechanism, for the purpose of embossing or printing each box that is being folded upon it.

I claim as my invention—

1. The vertically-reciprocating cutter E, carrying the cutting-blade m and the punching-tools n n, in combination with the horizontal carrier F, substantially as herein shown and described.

2. The vertical slide I, combined with the horizontally-moving blank-carrier F, to raise the carrier against the conveyer G, substantially as specified.

3. The glue-box H, constructed with the reciprocating perforated wiper m^2 beneath the perforated false bottom l^2 and above the regular bottom of the glue-box, substantially as specified.

4. In combination with the perforated reciprocating wiper m^3 of the glue-box, the pivoted rod r^2 and clamp s^2, substantially as described.

5. The combination of the glue-box with the loop t^2 suspended therefrom, and with the rod r^2 and clamp s^2, said rod having an inclined edge to be raised and lowered as it passes through said loop, substantially as described.

6. In combination with the reciprocating perforated wiper m^2 and vibrating clamp s^2 of a glue-box, the rock-shaft n^2, all arranged for automatic action, substantially as specified.

7. The glue-box H, carrying the reciprocating perforated wiper m^2, combined with the steam-jacket o^2, that has the pipes p^2 and q^2, substantially as specified.

8. The conveyer-block g^2 of the paper-box-making machine, combined with the embracing reciprocating sleeve h^2, substantially as herein shown and described.

9. In combination with the reciprocating sleeve h^2 and block g^2, the reciprocating face-pieces i^2, arranged to operate as set forth.

10. The combination of the block g^2 of the conveyer G with the reciprocating side pieces j^2, applied to said block g^2, substantially as and for the purpose specified.

11. The conveyer G, combined with the rock-shaft a^2, levers b^2, and inclined guide d^2,

all arranged to retain the conveyer in a vertical position during the vibration of the levers b^2, substantially as herein shown and described.

12. The combination of the blank-conveyer G with the stationary die J, vibrating folder L, and intermittently-rotating cross-shaped folder M, substantially as herein shown and described.

13. The rotary folder M, made with the upwardly-projecting ears k^3, and with the outwardly-projecting ears l^3, and arranged in the form of a cross, for constituting a combined folder and box-retainer, substantially as herein shown and described.

14. The improvement in the art of making paper boxes hereinbefore set forth, which consists in folding the sides and ends of the blank against a sleeve or box, h^2, while its bottom is held between the die J and block g^2, and subsequently raising the sleeve h^2 to discharge the paper box from the block g^2, substantially as described.

15. The improvement in the art of making paper boxes hereinbefore set forth, which consists in placing the ungummed paper blank against the under side of a conveyer, G, in subsequently moving the gummers m^2 m^2 over the ends of said blank, and in finally clamping the gummed ends of the blank to the said gummers, substantially as specified.

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