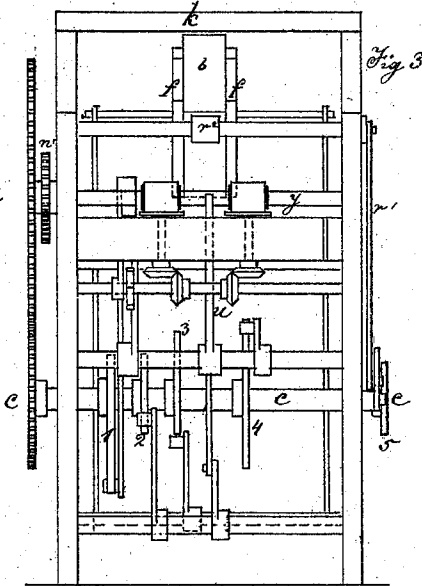
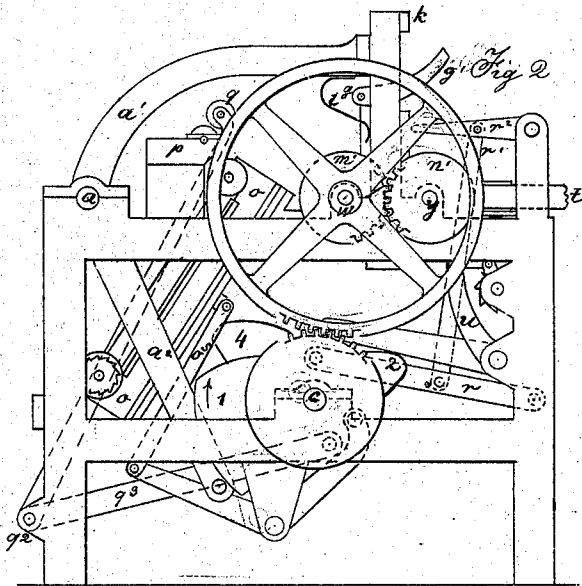
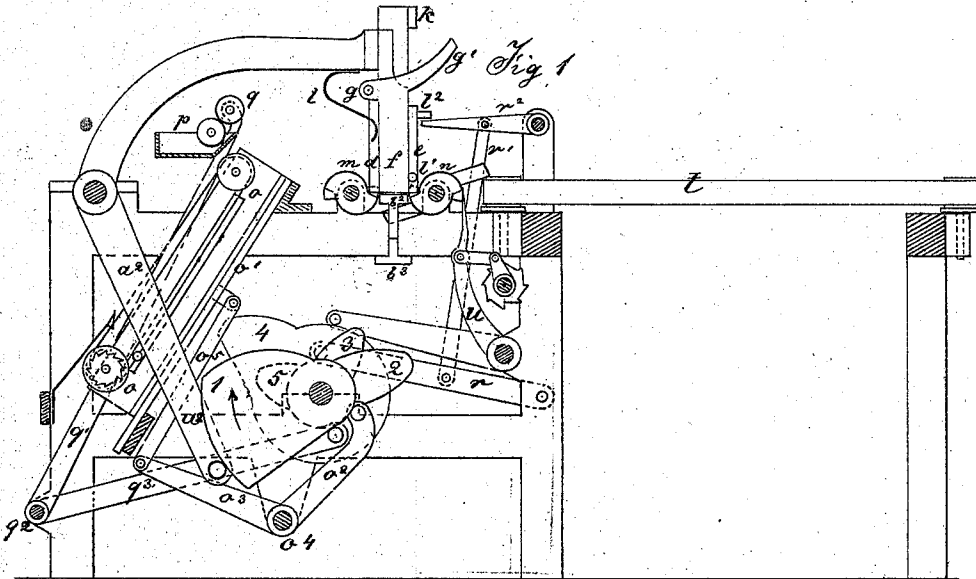


C. R. GRIMM.

Machines for Making Paper-Boxes.

No. 131,751.

Patented Oct. 1, 1872.



Witnesses.
 Albert H. Hook
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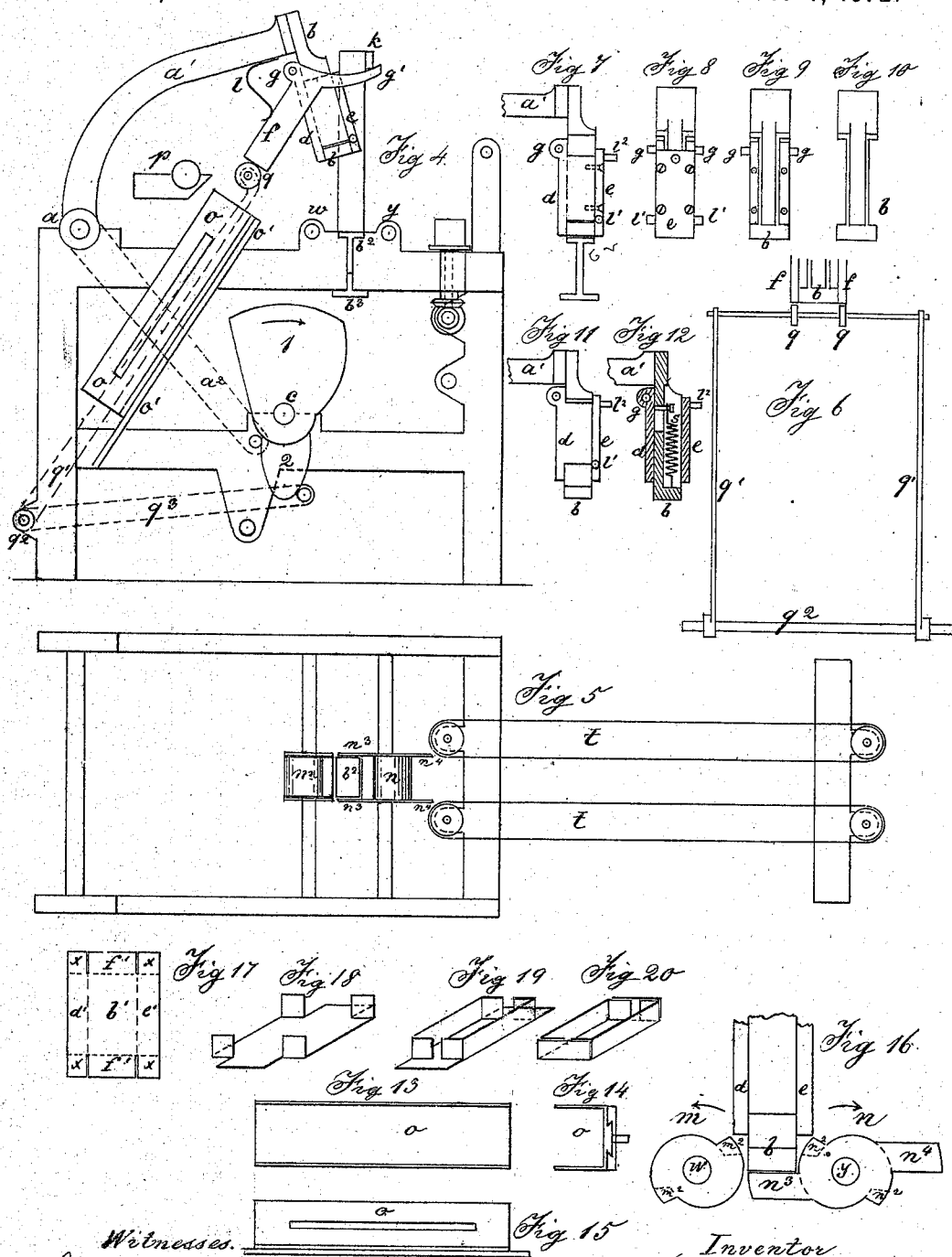
Inventor
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UNITED STATES PATENT OFFICE.

CHARLES RICHARD GRIMM, OF NEW YORK, N. Y.

IMPROVEMENT IN MACHINES FOR MAKING PAPER-BOXES.

Specification forming part of Letters Patent No. 1,311,751, dated October 1, 1872.

To all whom it may concern:

Be it known that I, CHARLES R. GRIMM, of the city, county, and State of New York, have invented a certain new and Improved Machine for Making Paper-Boxes; and that the following is a full and clear description thereof, reference being had to the annexed drawing, of which—

Figure 1 is a vertical longitudinal section through the machine; Fig. 2 is a side elevation; Fig. 3, a rear-end view of the same; Fig. 4, a sectional diagram of the frame and some of the principal parts, showing the formers and gummers in an elevated position; Fig. 5 is a plan view of the frame, the turners, the plate b^2 , and the carrying-off belts $t\ t$; Fig. 6, a front view of the gum-rollers and the swinging frame in which they are hung; Figs. 7, 8, 9, 10, 11 are detached views of the formers, the gummers being removed; Fig. 12 is a vertical longitudinal section of the formers; Fig. 13, a front view of the blank-feeding case; Fig. 14, an end view; Fig. 15, a side view of the same; Fig. 16, a side view of the formers and turners; Fig. 17, a diagram of the blank to be used in the machine to make the box of; and Figs. 18, 19, 20, perspective views of the various stages of formation of the box. Figs. 16 to 20, inclusive, are on a larger scale than the others.

The object of the invention is to construct a comparatively simple machine to make paper boxes of such a description and construction as shown in Fig. 20.

The machine is constructed as follows: a is a rock-shaft, in the center of which there is a curved arm, a^1 , and this arm carries at its end the main or center former b . The bottom end of this former b is of the size and shape of the bottom of the box, (b^1 in Fig. 17,) around which the said box is to be formed. Another arm, a^2 , attached to the rock-shaft a , extends downward and is operated by a cam, 1 , which is fastened upon the cam-shaft c . By means of this cam 1 the former b receives a swinging motion up and down. In Fig. 1 the former is shown in its lowered position, when the box is being formed around it, and in Fig. 4 the former is shown in its elevated position. The former b is furnished at its rear side with a plate, d , and at its front side with another plate,

e , both plates being secured together by any suitable means, and so arranged that they can slide up and down together on the center former b . The bottom ends of these plates d and e act as side formers for the corner flaps $x\ x\ x\ x$ (see Fig. 17) of the blank, and must be of the same shape and size as the side flaps d' and e' , and when lowered their ends must be even with the end of the center former b . On the two other sides of the center former b there are two swinging plates, $f\ f$, hinged, at g , to the rear side former d , which plates I call the gummers, they being intended to receive the gum which is required to stick the box together, and also to feed the blank into the machine. Their lower ends must be of about the shape and size of the end flaps f' of the blank, (see Fig. 17,) and must be even with the bottom of the formers b , d , and e , when the latter two are lowered. There is an arm, g' , extending out from the upper portion of each of these gummers, which, when the whole system of formers is being elevated to a position, as shown in Fig. 4, strikes against a bar, k , attached to the frame of the machine, and causes the said gummers f to swing over to a position, as shown in Fig. 4, in which position they receive the gum and also the blank, as will hereafter be described. When the arm a^1 and its system of formers are lowered, the gummers f swing back by means of springs l to a position parallel to the former b , (see Fig. 1,) there being a stop provided at each side of the former e , the stop being indicated in the various figures by letter l' . In lowering the arm a^1 the center former b is brought to a vertical position, and its end butts against a plate, b^2 , which conforms in shape to the bottom of the former b , and is supported by a cross-bar, b^3 , attached to the frame of the machine. The blank which the gummers f have brought under the bottom of the formers b , d , and e is being clamped between the former b and the plate b^2 , and held there while the formation of the box takes place. There are two revolving turners, m and n , one on each side of the formers, attached to revolving shafts w and y , which are geared together by gear-wheels $m^1\ n^1$, and which receive their motion from the cam-shaft c by gearing at the rate

of two to one, so as to cause the turner-shafts to make one-half of a revolution to each whole revolution of the cam-shaft, as clearly shown in Fig. 2. These turners are double cams of the same width as the center former *b*, their shape being clearly shown in Figs. 1 and 16. Each side of these turners is furnished with a flange made of sheet steel or other suitable material, and of a shape as shown in Fig. 16, their outlines coinciding with those of the inner turners, with the exception of a projection at $m^2 n^2$, which are in advance of the inside turners. These projections serve to turn up the corner flaps $x x x x$ of the blank; and the said flanges of the turners *n* are furthermore furnished each with two wings, $n^3 n^4$, at opposite points, (see Fig. 16,) which wings $n^3 n^4$ serve to turn up the end flaps f' of the blank. There is a case or channel, *o*, capable of sliding up and down in an inclined direction, arranged to hold a pile of blanks, which, by any suitable mechanism, are kept up to the top of the said case *o*. This case slides on an inclined plate, o^1 , which is fastened to the frame of the machine. It receives its motion up and down from a cam, 3, on the cam-shaft *c*, by means of the levers o^2 and o^3 , which are fastened upon a rock-shaft, o^4 , and a link, o^5 , connecting the lever o^3 with the case *o*. The cam 3 raises the case *o*, and its own weight is sufficient to bring it down. *p* is a stationary gum-box, and arranged in the ordinary manner. It supplies gum to rollers *q*, (see Figs. 1, 2, 4, and 6,) which are upon a shaft hung in a swinging frame, $q^1 q^1$, which can move back and forth on a rock-shaft, q^2 , and is operated by a cam, 2, and a lever, q^3 .

The operation of the machine is as follows: The cam-shaft *c* and its cams revolving in the direction of the arrow in Figs. 1 and 4, the arm a^1 and the formers *b*, *d*, and *e* are raised to the position shown in Fig. 4, and the gummings *f* are thrown over to a slanting position, as shown in the same Fig. 4. Remaining in this position, the gum-rollers *q* in their frame q^1 are brought forward and come in contact with the bottom of the gummings *f*, which are thus supplied with gum, as shown in Fig. 4. Now, the said gum-rollers return instantly to their former position in contact with the gum-box, as shown in Figs. 1 and 2, and at the same time the blank-feeding case *o* is raised until the uppermost blank comes in contact with the bottom of the gummings, and becomes fastened thereto by means of the gum at the bottom of the gummings *f*. Next, the formers are lowered, and the gummings *f* return to their original position, parallel to the formers, and the blank, still adhering to the gummings *f*, is carried down upon the plate b^2 , and there clamped between the said plate and the center former *b*.

The next operation the blank undergoes is the turning up of the corner flaps $x x x x$, which is done by the side flanges $m^2 n^2$ of the

turners *m* and *n*, which turners revolve in direction of the arrows in Fig. 16. Now the blank has assumed the shape shown in Fig. 18, and the side formers *d* and *e* and the gummings *f* attached thereto must be raised to a position, as shown in Fig. 16, so as to make room for the turning of the side flaps d' and e' of the blank, while the center former *b* remains yet in its downward position, holding the blank. The raising of the side formers *d* and *e* is effected by a cam, 5, upon the cam-shaft *c*, which operates on a lever, *r*. A connecting-rod, r^1 , transfers the motion to the lever, r^2 , which thus lifts the formers *d* and *e* by a pin, l^2 , attached to the side former *e*, as clearly shown in Fig. 1. When the side formers *d* and *e* and the gummings *f* are thus raised the turners *m* and *n* proceed further in their revolution, and one of the cam portions of each of the center turners begins to turn up the side flaps d' and e' of the blank, leaving the blank in a shape as shown in Fig. 19. At last the wings n^3 proceed and turn up the end flaps f' of the blank, and in doing so exercise considerable pressure upon the ends of the box so formed on the center former *b*, and cause the end flaps $f' f'$ to adhere to the corner flaps $x x x x$ by means of the gum left upon the end flaps $f' f'$ by the gummings. Now the box is complete and of the shape shown in Fig. 20, and the center former, being raised and withdrawn from the box, leaves the box between the wings n^3 . As the center former rises, the pin l^2 is released from the pressure of the lever r^2 , and the side formers *d* and *e* and the gummings *f* are forced down by a spiral spring, *s*, contained in the interior of the center former *b*, (see Fig. 12,) thereby assisting the center former *b* in clearing itself from the box. As the turner *n* continues its revolution and the wings n^3 with their box arrive at the opposite side, where the wings n^4 are shown in Fig. 16, the box must be discharged from the wings, and may be transferred to a pair of endless bands, *t t*, which carry the box off to other contemplated operations, if required, such as sanding, printing, &c.

The transferring of the boxes from the wings to the endless bands *t t* may be effected by a lever, *u*, which is operated by a cam, 4, on the cam-shaft *c*. The lever *u*, being pointed, (see Fig. 1,) can pierce in between the turner and the box, and, by moving outward at the proper time, will push the box out from between the wings and transfer it to the bands.

It should be mentioned that the formers are so operated by the cam *l* that their downward motion is effected by positive power, while a spring (not shown in the drawing) may return the same to their elevated position; or a grooved cam may be employed to produce both motions up and down. Instead of giving the formers a swinging motion they may be moved up and down vertically.

Claims.

I claim as my invention—

1. The double cam-faced turners m and n , having cam folding-flanges m^2 m^2 n^2 n^2 and folding-wings n^3 n^4 , as described.

2. The formers b , d , and e , and gummers f , combined and arranged substantially as and for the purpose specified.

3. The reciprocating blank-holder, arranged with relation to the gummers f f so as to feed the blank thereto, substantially as described.

CHARLES RICHARD GRIMM.

Witnesses:

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C. A. BROWN.