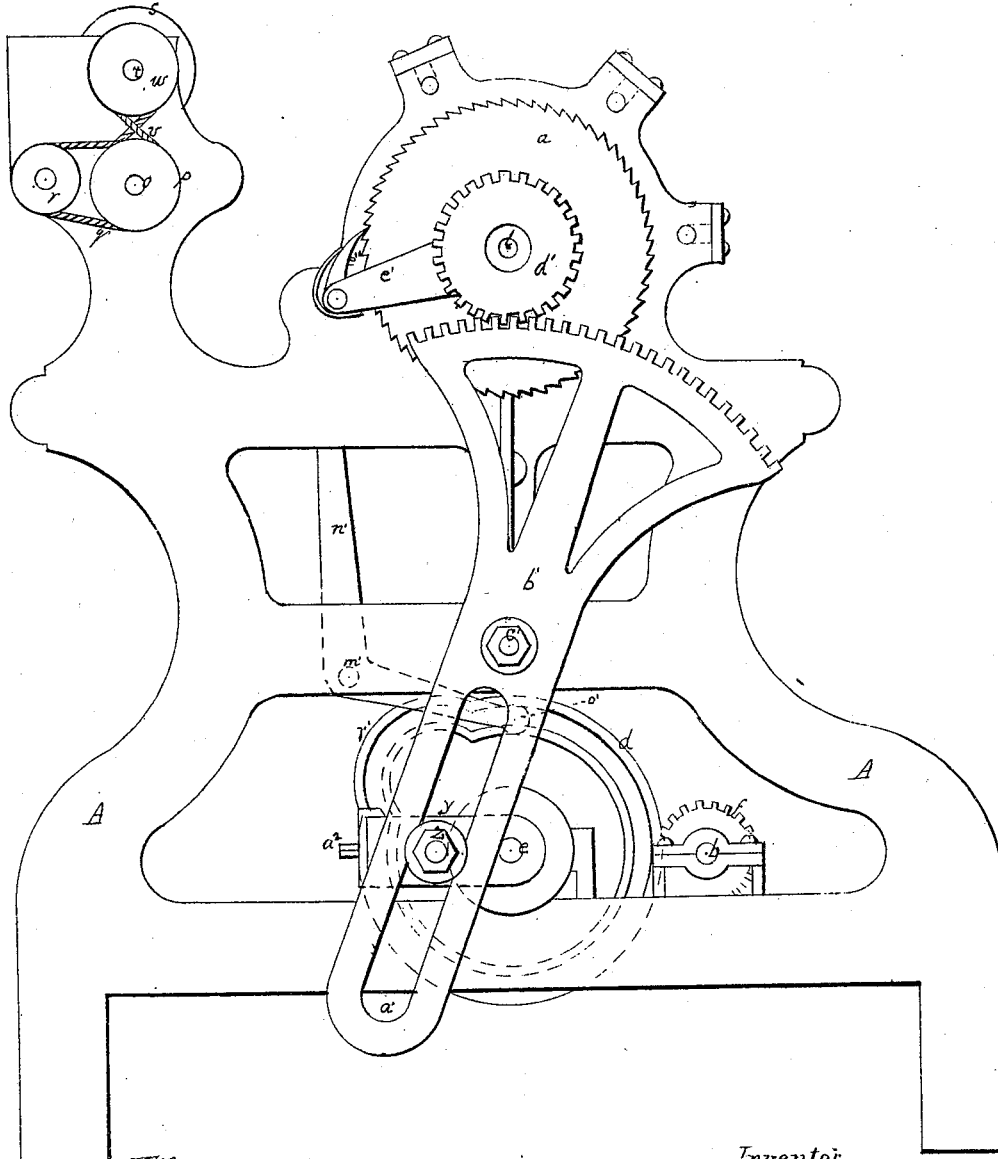


*J. E. Coffin*  
*Paper Cutter.*

*7. Sheets. Sheet. 1.*

*No. 110631.*

*Patented Jan. 3. 1871*



Witness

*Wm. Henry Clifford*  
*Henry C. Houston*

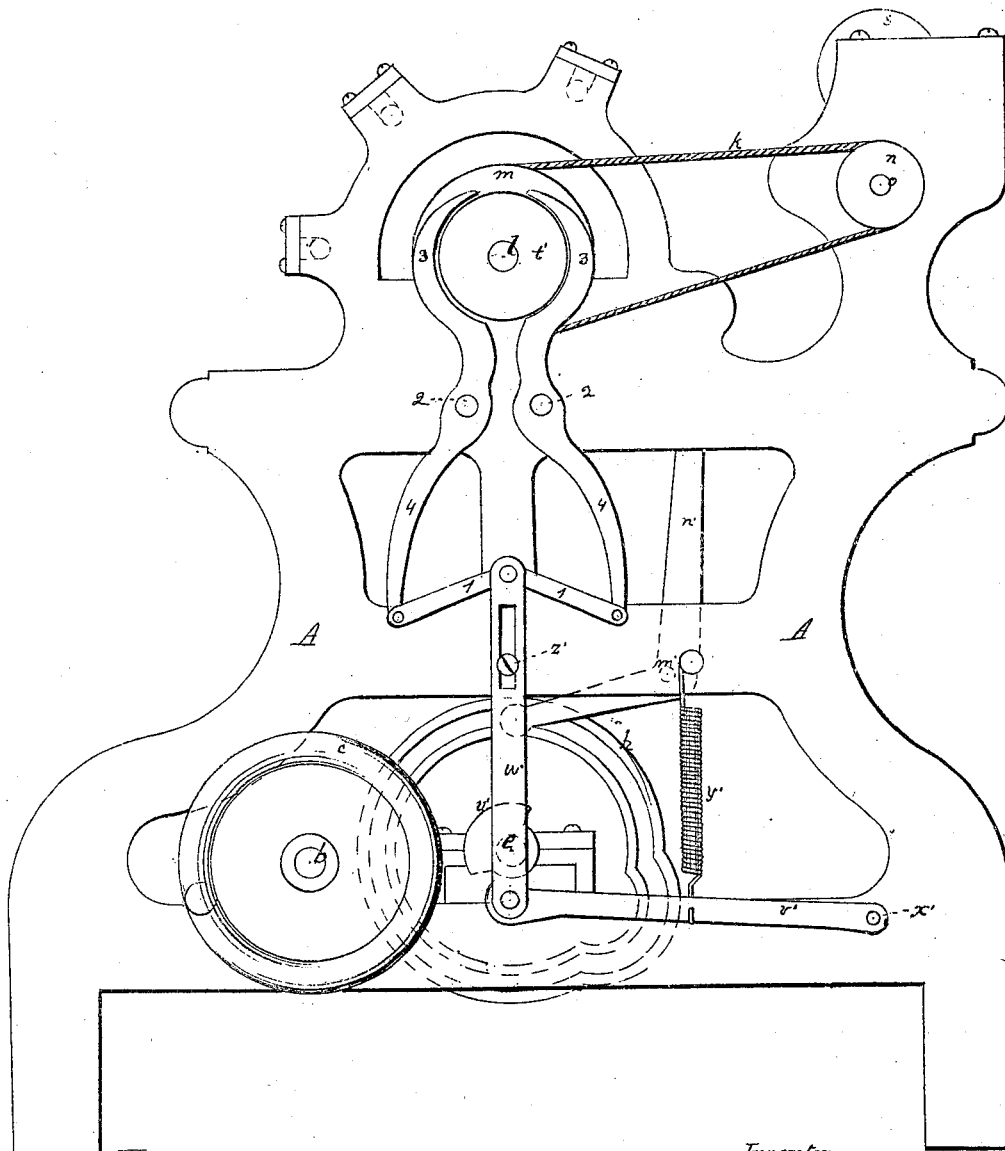
Inventor

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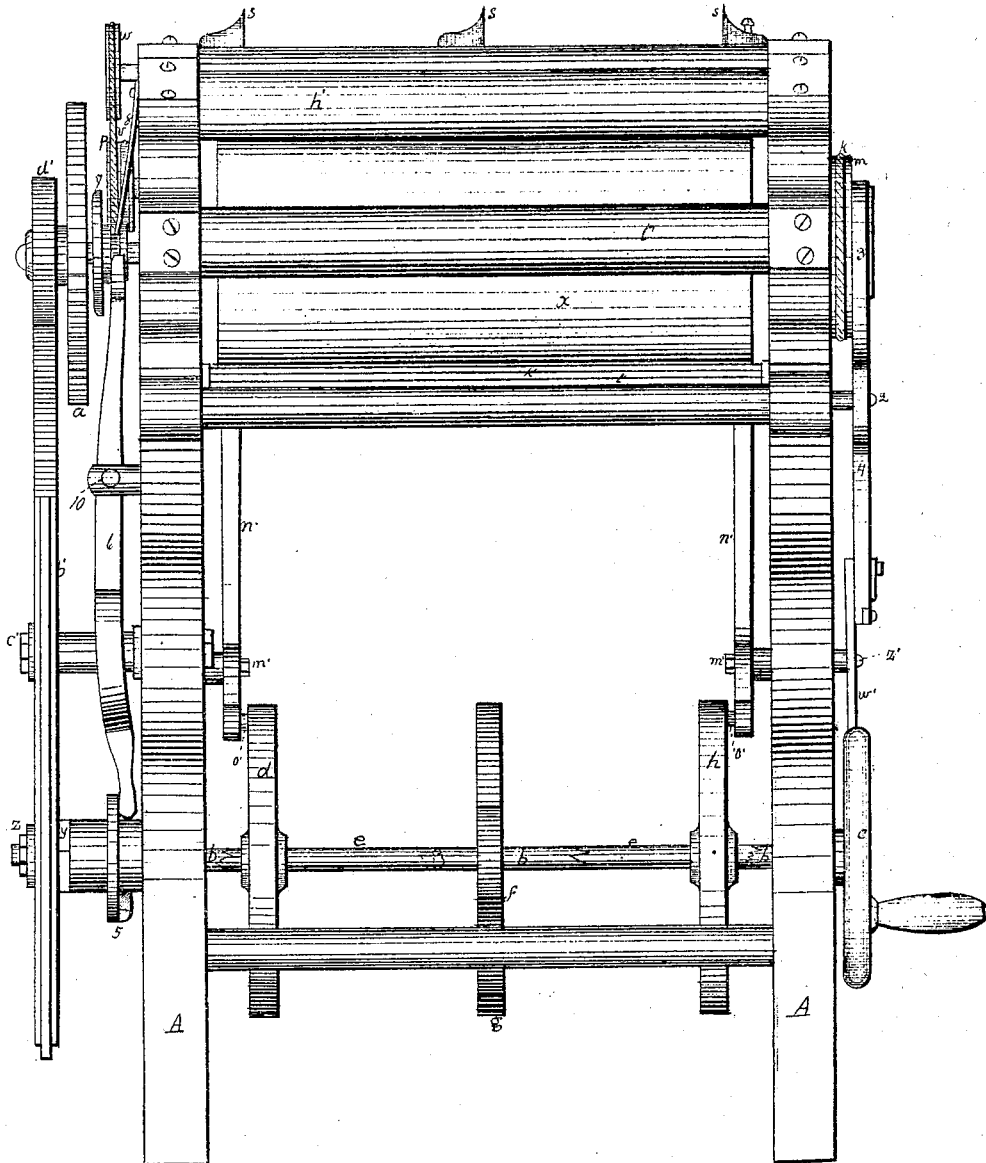
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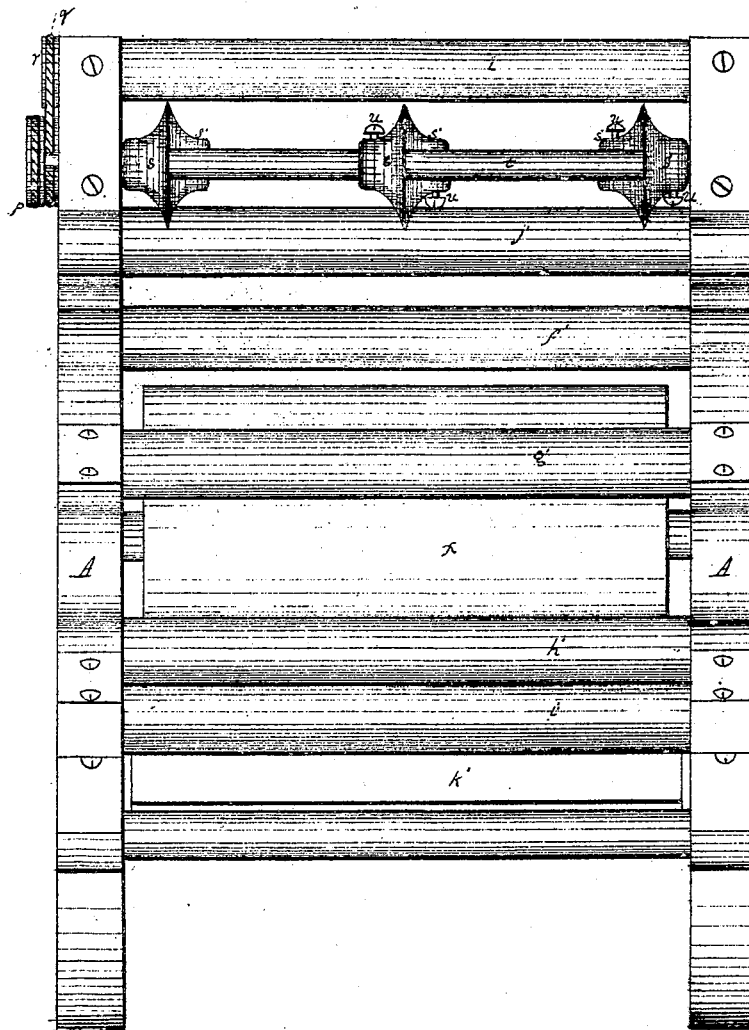
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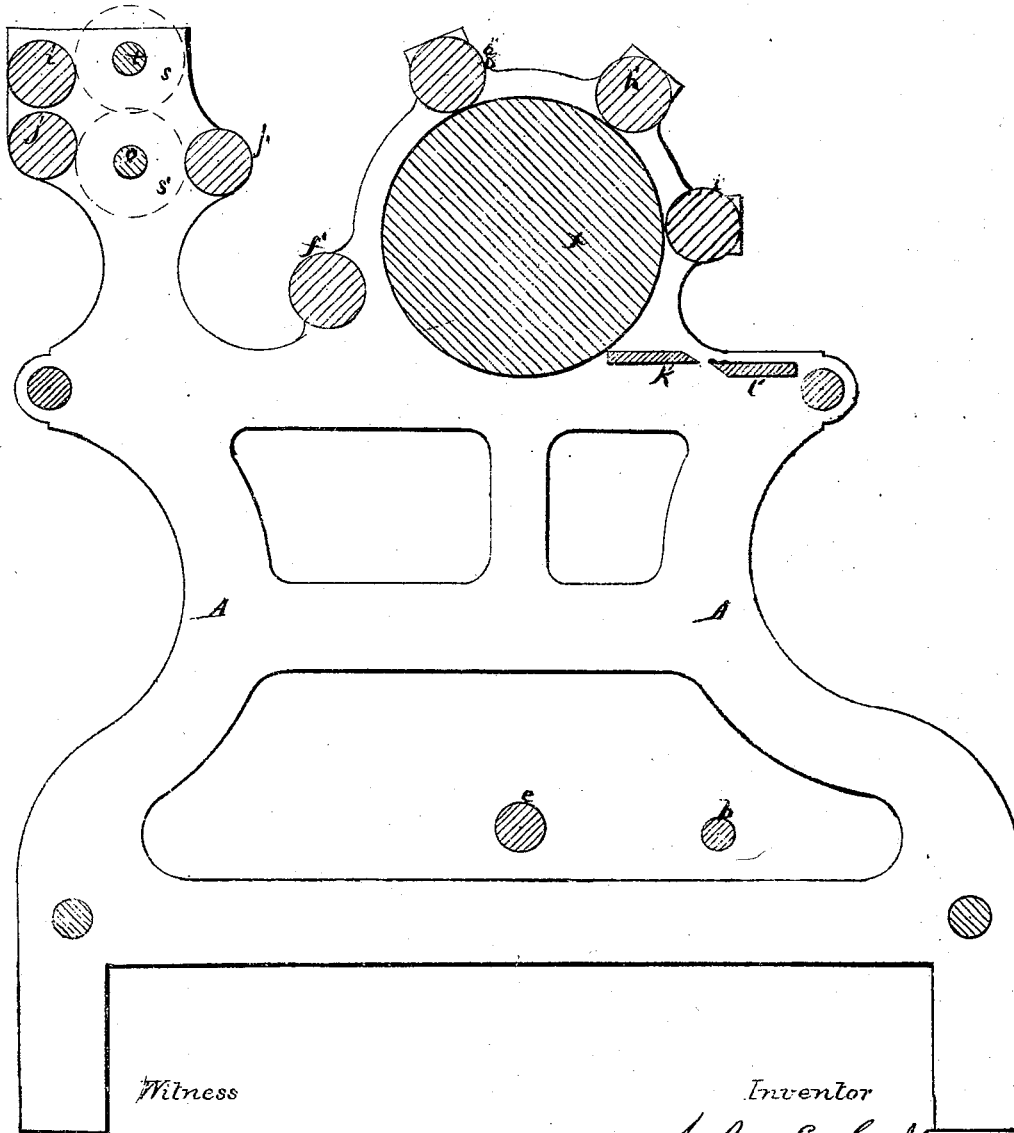
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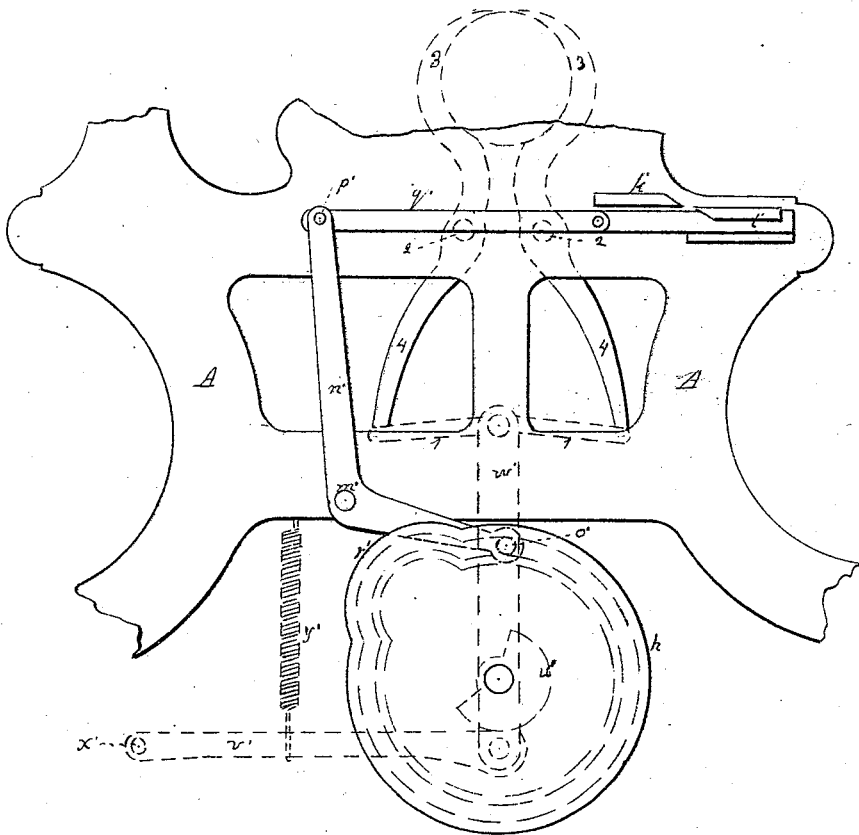
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Fig. 1.

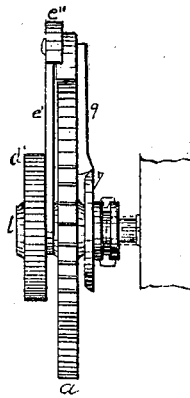
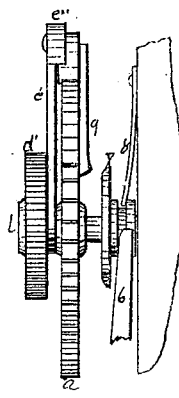


Fig. 2.



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# UNITED STATES PATENT OFFICE.

JOHN E. COFFIN, OF PORTLAND, MAINE, ASSIGNOR TO FREDERICK W. BAILEY AND JAMES NOYES, OF SAME PLACE.

## IMPROVEMENT IN PAPER-CUTTING MACHINES.

Specification forming part of Letters Patent No. **110,631**, dated January 3, 1871.

*To all whom it may concern:*

Be it known that I, JOHN E. COFFIN, of Portland, in the county of Cumberland and State of Maine, have invented a new and useful Machine for Cutting Dimension-Paper; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable others to make and use my invention, reference being had to the accompanying drawing, forming part of this specification, in which—

Plate 1 shows a side elevation of one side of my machine. Plate 2 is a side elevation of the opposite side. Plate 3 is a front end elevation. Plate 4 is a top plan. Plate 5 is a vertical section. Plate 6 is a view of the inside of a portion of my machine to illustrate the method of moving the shears. Plate 7 is a detail to show the method of relieving the wear of the pawl upon the ratchet *a*.

The general purpose of my invention is to provide a machine in which dimension-paper may be cut by first dividing the same into long strips of such width as may be desired by means of adjustable rotary cutters, and then by cutting the said strips into pieces of such length as may be required by means of the intermittent operation of the shears.

The operating parts of my machine are set in and attached to an appropriate frame, A.

In order to move the machine, power is applied to the shaft *b*, to which is shown attached in the drawing the hand-wheel *c*. The shaft *b* is represented in Plate 3 as being broken out, in order to exhibit in the rear of it the shaft *e*. Upon the shaft *b* is rigidly set the small gear *f*, matching the larger gear *g*, rigidly attached to the shaft *e*. Upon this shaft *e* are also rigidly attached the two cams *d* *h*. It will thus be seen that by the revolution of the wheel *c* motion is conveyed to the shaft *e* and the two cams before mentioned.

The shafts *b* and *e* are appropriately mounted in the sides of the frame A, as illustrated in Plates 1 and 2.

On the back side of the machine near the top, and set in the frame A in the ordinary manner, are seen the two rolls *i* *j*. (See Plate 5.) Motion is communicated to these rolls as follows: A band, *k*, Plate 2, passing from the truck *m* on the shaft *l*, is carried around the truck *n*, which is rigidly attached to the shaft

*o*; and, on the opposite end of said shaft *o*, on the other side of the machine, Plate 1, there is another truck, *p*, from which a band, *q*, extends around the truck *r*, which is set on the same shaft as the roll *j*. The upper roll, *i*, is moved by friction as the paper to be cut is inserted between these two rolls.

The method by which motion is imparted to the shaft *l* will be hereafter described.

Next after the rolls *i* *j* in the order of operation of the machine are the shafts *o* *t*, Plate 5, carrying the rotary adjustable cutters *ss'*. The arrangement of these is best exhibited in the top plan in Plate 4, the set *s'* being arranged upon a shaft immediately underneath the shaft *t*, upon which the set *s* is arranged, so that their cutting-edges shall slightly overlap, in order to more perfectly effectuate the cutting. They are all adjustable by set-screws *u*, which permit of the said cutters being moved toward or from each other along the shafts *t* and *o*, and also hold the same at any desired position on the shafts, according to the width into which the strips of paper are to be cut.

The method of rotating the shaft *o* has already been described—to wit, by the band K, and the method of revolving the shaft *t* is seen in Plate 1—to wit, by means of the truck *p*, band *v*, and truck *w*.

*x* shows a large drum or roll, set on the shaft *l*, which shaft is revolved by the following means: Upon the shaft *e*, at one extremity thereof, Plate 1, is rigidly attached the crank *y*, which has the pin *z*, working in the slot *a'* of the sector *b'*. The sector is pivoted at *c'* to the frame A, so as to admit of its vibratory motion backward and forward, as impelled by the crank *y*.

As the shaft *e* is rotated, an intermittent reciprocating motion is imparted to the sector *b'*. The teeth of the sector match those of the loose gear *d'* on the shaft *l*; but as the forward motion is imparted to the gear *d'* it carries with it the arm *e'* and pawl *e''*, which, striking the teeth of the ratchet *a*, revolves it, and with it the drum *x*.

It will be perceived that only a partial revolution is imparted at each time to the drum *x* by the teeth of the sector, and that immediately thereafter there is a short pause in the motion of the drum while the stud *z* is moving vertically in the slot *a'*; also, that while the



stud  $z$  is describing the lower half of the circle in which it moves, the pawl  $e''$  is revolving the ratchet  $a$  and drum  $x$ , and that while  $z$  is describing the upper part of the circle in which it moves the pawl  $e''$  is being carried backward over the ratchet  $a$ , preparatory to again commencing the forward movement.

It is also evident that the pawl  $e''$  is carried back when the stud  $z$  is nearest the periphery of the sector, and is therefore carried backward by a more rapid movement than that which it imparts to the drum  $x$  when moving forward.

Around the drum  $x$ , on shafts set into the frame of the machine, are seen the small rolls  $f' g' h' i'$ , and, immediately in front of the cutters  $s'$ , the small roll  $j'$ . The two rolls  $j'$  and  $f'$  serve to guide and direct the paper in its passage from the cutters  $s'$ , and the rolls  $g' h' i'$  confine the paper in place on the drum  $x$ , keep it even, and regulate its motion over the same. This drum is cast hollow and in two parts, and may be thus planed upon a lathe, and the two parts then united. This is necessary, as it is of great importance that the surface of the drum should be as smooth as possible, to allow the paper to pass over it evenly. Passing up over the drum  $x$ , the paper then approaches the cutters  $k' l'$ , whose operation will next be described. (See Plate 3 and Plate 6.) These cutters or shears  $k' l'$  are operated by the two cams  $d$  and  $h$ , set upon the shaft  $e$ . The form of the cam or the path on the same is clearly seen at  $h$  in Plate 6. Pivoted to the inside of the frame  $A$  at  $m'$ , Plate 6, is the bell-crank lever  $n'$ , with the stud  $o'$  working in the path on the cam  $h$ . Connected with  $n'$  at  $p'$  is the horizontal arm  $q'$ , to which is attached the movable cutter  $l'$ . The other cutter,  $k'$ , is fixed. When the pin  $o'$  is reached by the part  $r'$  of the cam, by the revolution of said cam the knife  $l'$  is drawn toward  $k'$  at the proper time to cut the paper passing between the two shears; but the order and succession of the operation of the various devices will be hereafter described.

Attention is now directed to Plate 2, where is seen the truck  $t'$ , rigidly set upon the shaft  $l$ , which is the same shaft as that upon which the drum  $x$  is fixed. Upon the shaft  $e$  is rigidly affixed the cam  $u'$ . As the shaft  $e$  revolves and turns downward the cam  $u'$ , it pushes downward the pivoted arm  $v'$ , pivoted to the frame of the machine at  $x'$ , and otherwise held slightly inclined upward by the coiled spring  $y'$ . Pivoted to  $v'$  is the vertical slotted arm  $w'$ , with the headed pin  $z'$  set into the frame of the machine and working in the slot. This arm is connected with the toggle 1, which operates the two arms 4 4, pivoted at 2 2 to the frame of the machine, and having the curved or hooked ends 3 to encompass and clamp the truck  $t'$  on the shaft  $l$ .

Now, when the cam  $u'$  presses downward the arm  $v'$ , as described, the hooked ends 3 clamp the truck  $t'$  and hold it stationary, and with it the drum  $x$ . The object of this is that

the paper over the drum may not move or be drawn while the shears are operating upon it. As previously remarked, the pawl  $e''$ , when passing backward over the ratchet  $a$ , is lifted above the same, so as to avoid wear and the clicking noise. This is effected by the combination of the cam 5, the lever 6, the truck 7, the spring 8, and the piece 9 attached to the pawl.

The operation is as follows: As the shaft  $e$  revolves, and the pawl  $e''$  has moved forward and imparted one partial revolution to the drum  $x$ , the projection on the inner face of the cam 5 passes under the lower end, and at one side of the same, of the lever 6, causing the lever to move on its pivot 10, and thus slide the truck 7 up close to the inner face of the ratchet  $a$ . This takes place immediately before the pawl  $e''$  commences to move backward over the ratchet  $a$ , and as it does so the piece 9, attached to the spring-head of said pawl, being obliged to pass over the periphery of the truck 7, Figs. 1 and 2, Plate 7, the spring-head of the pawl is lifted out of the teeth of the ratchet  $a$ , and so passes over the same. The upper end of the lever 6 is provided with a bifurcation to fit a small groove in the hub of the truck 7. (See Plate 3, and Fig. 2, Plate 7.)

The general operation of the machine may be thus described: The paper, entering the machine between the rolls  $i j$ , passes between the cutters  $s s'$ , where it is cut into strips, then under the roll  $f'$ , then over the drum  $x$ , and between it and the small rolls  $g' h' i'$ , from which it passes down between the two cutters  $k' l'$ , and is there cut into lengths, as before stated.

The order and succession of the motions and operations of this machine, by which these effects are accomplished, are as follows: The two rolls  $i j$ , the strippers  $s s'$ , the rolls  $j' f' g' n' i'$ , and the drum  $x$ , all move simultaneously, in order to carry the paper between the shears  $k' l'$ , that it may be cut into pieces of the desired length. This length is regulated by the position of the stud  $z$  in the crank  $y$ , where it can be adjusted nearer to or farther from its center of revolution by means of the screw  $a^2$ , which moves a block in a slot in the said crank  $y$ , into which block the shank of  $z$  is inserted. When the strippers, rolls, and drum have ceased their motion the pins  $o'$  enter the parts  $r'$  of the cams  $n d$ , by which, as before described, the shears  $k' l'$  are brought together and the paper is cut off.

It may be well here to specify that there are two bell-cranks,  $n'$ , one for each of the cams  $d h$ , as shown in Plate 3, with arms like  $q'$  attached to each end of the moving cutter  $l'$ , both being of the same construction, as illustrated in Plate 6.

While the shears are thus cutting the paper the pawl  $e''$  is moving backward over the ratchet  $a$ , preparatory to again engaging the same to bring forward another length of the paper, when the same operation is repeated.

If desired, the arm  $q'$  may be jointed near the center thereof, and the part to which the knife  $l'$  is attached move on a horizontal track, so that the knife  $l'$  may move in a perfectly horizontal line, and be unaffected by the slight curvilinear motion described by the upper end of the bell-crank  $n'$ .

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

1. In the combination, consisting of the crank  $y$ , the adjustable stud  $z$ , the sector  $b'$ , the gear  $d'$ , the ratchet  $a$ , the pawl  $e''$ , and the drum  $x$ , constructing the sector  $b'$  with the crank-slot  $a'$ , substantially as described.

2. The combination of the cam 5, the lever 6, and the truck 7, the piece 9, and the pawl  $e''$ , substantially as described.

3. The cam  $u'$ , the arm  $v'$ , and spring  $y'$ , the arm  $w'$ , toggle 1, and the arms 4 3, in combination with the truck  $t'$  on the shaft  $l$ , as described.

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Witnesses:

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HENRY C. HOUSTON.