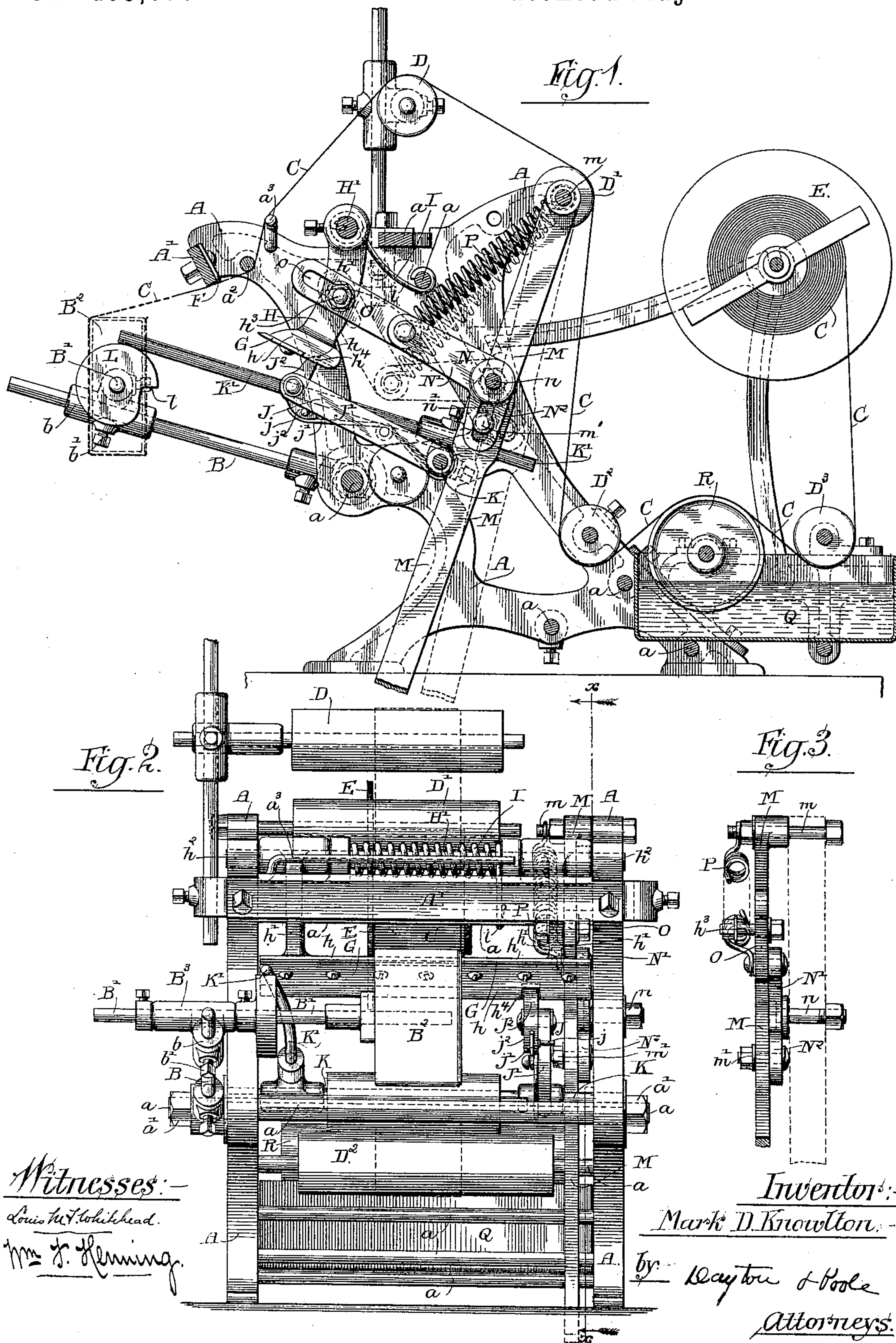


(No Model.)

M. D. KNOWLTON.  
PAPER BOX COVERING MACHINE.

No. 403,677.

Patented May 21 1889.



*Witnesses:-*  
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# UNITED STATES PATENT OFFICE.

MARK D. KNOWLTON, OF CHICAGO, ILLINOIS.

## PAPER-BOX-COVERING MACHINE.

SPECIFICATION forming part of Letters Patent No. 403,677, dated May 21, 1889.

Application filed November 11, 1887. Serial No. 254,884. (No model.)

*To all whom it may concern:*

Be it known that I, MARK D. KNOWLTON, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Paper-Box-Covering Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to an improved apparatus for covering paper or straw-board boxes.

The invention consists in the matters hereinafter described, and pointed out in the appended claims.

In the accompanying drawings, illustrating my invention, Figure 1 is a vertical section of a machine embodying the same, taken upon line  $x x$  of Fig. 2. Fig. 2 is a front elevation of the machine shown in Fig. 1. Fig. 3 is a detail elevation of certain of the parts shown in Figs. 1 and 2.

In the said drawings, A A are two vertical parallel frame-plates, which, together with cross rods or bars  $a a^2$ , form the frame of the machine and sustain the paper strip, guides, and moistening devices for the same, together with the cutting devices for severing said strips transversely at the time of applying them to the box shell or foundation. The form-block, the cutting devices, and parts connected with and actuating the same will first be described. Said parts are made as follows:

B is an arm attached to and extending outwardly from the machine-frame and carrying a horizontal arm, B', upon which is mounted a form-block, B<sup>3</sup>, upon which the straw-board foundation or shell is held in the operation of covering the same. The shaft B' is rotatably supported upon the arm B, and for this purpose is herein shown as having bearings in a long sleeve, B<sup>3</sup>, which is provided with a socket, b, constructed to slide upon the arm B, and held in place thereon by a set-screw, b'. The said arm B is attached to the machine-frame in such manner as to allow it to swing in a vertical plane, the arm being for this purpose mounted upon the end of one of the brace-rods, a, of the frame, which extends

outside of the frame-plate A, the arm being held rigidly in position by a clamp-nut,  $a'$ , placed upon the rod  $a$  and bearing against the hub of the arm. By swinging the rod B about its pivot and sliding the bearing B<sup>3</sup> longitudinally thereon the supporting-shaft B' of the form-block may be shifted to any desired position, according to the size of the form-block employed and other circumstances.

C indicates a paper strip employed in covering the box, and D D' D<sup>2</sup> D<sup>3</sup> are guide-rollers, over which the said strip passes from a reel, E, to the form-block.

A' is a stationary cross-bar located above and somewhat to the rear of the form-block. Said bar A' carries a stationary shear-blade or cutter, F, which acts in connection with a swinging or oscillating cutter, G, which is attached to the free end of a pivotally supported or swinging frame, H, herein shown as consisting of a cross-bar, h, and two arms, h', which latter are rigidly attached to a horizontal shaft, H', having bearings at  $h^2 h^2$  in the frame-plates A A of the machine. The cutter G stands normally below and at the rear of the cutter F, and is swung forwardly and upwardly toward the latter in the operation of severing the paper strip. Said paper strip is drawn or carried beneath the stationary cutter F and adjacent to and in contact with the latter in its passage from the guide-roller D to the form-block. I have herein shown the said strip as carried over a stationary guide-rod,  $a^2$ , at the rear of and adjacent to the cutter F, and over another guide-rod,  $a^3$ , between the rod A' and the roller D.

The movable cutter G is actuated for severing the strip by means of a spring held in its retracted position by means of a detent controlled by a cam upon the revolving shaft B', which carries the form-block, so that the said cutter will be released and thrown forward by the spring to sever the strip at a time when a sufficient quantity of paper has been drawn forward past the stationary cutter by the operator to extend around or cover the straw-board shell. The cutter is drawn back or retracted after it has been thrown forward by the spring by an act of the person operating the machine through the medium of a



lever connected with the frame which carries the said movable cutter. The cutting-edge of the movable cutter G is preferably made slightly spiral or oblique with reference to the edge of the stationary cutter, so that the cutters will operate with a shearing action in cutting the paper.

In the particular embodiment herein illustrated of the features of construction above generally set forth, the devices for operating the movable cutter are made as follows:

I is a spring for throwing the movable toward the stationary cutter, said spring being of coiled form and placed around the shaft H' with one end attached to the shaft and its opposite end extended outwardly, as shown at *i*, and permanently engaged with one of the cross-rods *a* of the machine-frame. The end of the said spring I, which is attached to the shaft H', is herein shown as connected with the latter by having its end bent inwardly and inserted in an aperture in the shaft, as clearly shown in Fig. 1. The actuating-spring I is so strained or placed under tension that it tends to throw the free end of the frame H and the cutter G attached thereto forwardly and upwardly toward the stationary cutter F. The arms *h'* of said frame H are herein shown as secured to the shaft H' by means of set-screws inserted through the hubs upon the arms and engaging the shaft, thereby enabling the angular position of the frame to be changed as desired.

J indicates as a whole a spring-detent, which consists of a swinging arm, J', and a pivoted dog, J<sup>2</sup>, mounted at the outer or free end of the arm J'. The arm J' is pivotally supported upon the machine-frame with its axis of rotation horizontal and parallel with the shaft H' of the movable cutter G and in position to sustain the dog J<sup>2</sup> beneath and in engagement with the frame H at the time the latter is depressed or retracted. Said frame is provided with a notch, *h*<sup>4</sup>, as indicated in dotted lines in Figs. 1 and 2, which notch is located in position for engagement with the said dog J<sup>2</sup> of the detent J when the movable cutter is retracted. The said dog J<sup>2</sup> is provided with a stop or pin, *j*, so arranged as to allow the upper or free end of said dog to swing rearwardly and downwardly when encountered by the frame H in the downward and rearward movement of the latter, but adapted to hold the said dog rigid and approximately at right angles to the arm J' and in position to remain in engagement with the notch *h*<sup>4</sup> when the free end of said dog is carried forwardly and upwardly by its engagement with the said notch. The said dog J<sup>2</sup> is held normally in position to engage the notch *h*<sup>4</sup> and with the stop or pin *j* in contact with the arm J' by means of a spring, *j'*, attached to the said arm and acting upon the said dog.

In the particular construction illustrated the dog J<sup>2</sup> is provided with a spur or exten-

sion, *j*<sup>2</sup>, upon which the pin *j* is placed and against which the spring *j'* bears. The dog J<sup>2</sup> is by the construction described obviously adapted to automatically engage the notch *h*<sup>4</sup> when the arm J' is at the upper limit of its movement. The said dog is released from the said notch *h*<sup>4</sup>, however, by a downward movement of the free end of said arm away from the swinging frame H. This downward movement of said arm J' is accomplished automatically at the desired time in the revolution of the form-block by devices as follows: The said arm is rigidly attached to a horizontal shaft, K, which is rotatably mounted in the side plates of the machine. To the said shaft K is rigidly affixed an arm, K', which arm extends forwardly to a point adjacent to the form-block shaft B' and is arranged to bear upon a cam, L, attached to the said shaft. The cam L is circular throughout the greater part of its periphery, but is provided at one point with a depression, *l*, into which the end of the arm K' is adapted to enter at a certain point in each revolution of the form-block. The circular and concentric part of the cam L is adapted to sustain the arm K' in such position as to hold the detent-arm J' at the upper limit of its movement and to retain the dog J<sup>2</sup> in engagement with the swinging frame H. The entrance of the end of the arm K' into the notch *l*, however, allows the detent-arm J' to swing away from the frame H, and thereby disengage the latter and allow the movable cutter to swing forward to sever the paper strip. The arm K' is herein shown as arranged to rest upon the top of the cam L, so that the said arm will fall into the notch *l*, and the detent J' will swing downwardly by gravity. In other circumstances, however, a spring may be applied to move the detent arm for releasing the movable cutter, in the manner described.

The notch *l* will be so arranged with relation to the form-block B<sup>2</sup> as to effect the cutting of the paper strip at such point as will bring the joint of the paper in a desired place and give a suitable amount of lap to the paper, according to the judgment or preference of the person operating the machine.

Means for swinging or throwing the movable knife backwardly after the paper has been severed are herein shown as follows:

M is an actuating-lever, herein shown as arranged in a downwardly and forwardly inclined position and adapted for actuation by the foot of the operator. Said lever M is shown as pivotally supported at the upper and rear part of the frame by means of a pivot-bolt, *m*, affixed to one of the frame-plates A.

N is a bell-crank lever pivoted upon a pivot-bolt, *n*, which is secured in the frame-plate A adjacent to the lever M and somewhat below the pivot of the said lever M. The said bell-crank lever is provided with an arm, N', which extends forwardly toward the pivoted cutter-supporting frame H, and with another



depending arm,  $N^2$ , arranged approximately at right angles to the arm  $N'$ . Said arm  $N^2$  is provided with a longitudinal slot,  $n'$ , which is engaged with a stud,  $m'$ , rigidly affixed to the foot-lever M.

O is a bar pivoted at one end to the free end of the arm  $N'$  of the bell-crank lever N and connected at its opposite end with one of the arms  $h'$  of the swinging frame H by means of a longitudinal slot,  $o$ , in the bar, engaging a stud,  $h^3$ , upon the arm of the swinging frame.

P is a spring connected with the free end of the arm  $N'$  of the bell-crank lever, and with the frame of the machine above the bell-crank lever, and tending to draw the free end of said arm  $N'$  upwardly, so as to bring said arm  $N'$  and the bar O in alignment with each other. When the movable cutter is retracted, as shown in full lines in Fig. 1, the said stud  $h^3$  is at the inner end of the slot  $o$  of the bar O, and said stud  $h^3$  is free to slide through said slot and thereby allow the swinging frame H to move forward for severing the paper in the manner before described. After the said swinging frame has been released and the paper severed, however, the stud  $h^3$  rests in the extreme outer end of the slot  $o$ , so that by pulling backwardly upon the said bar O at such time the frame and movable cutter will be retracted. The movable cutter is drawn back in the operation of the devices last described by thrusting or pushing backwardly the lower end of the lever M. In such backward movement of the lever the stud  $m'$ , acting upon the depending arm  $N^2$  of the bell-crank lever, serves to swing said bell-crank lever about its pivot and thereby depress the free end of the arm  $N'$  thereof. Such movement of the said arm  $N'$  draws the connecting-bar O downwardly and backwardly to the position indicated in dotted lines in Fig. 1, thereby drawing the cutter-carrying frame H backwardly against the action of the spring I until said frame is engaged and held by the dog  $J^2$  of the detent J. The spring P obviously serves to throw the bell-crank-lever arm upwardly and thereby place the parts in position to allow the succeeding movement of the movable cutter as soon as the lever M is released.

It will of course be understood that as far as the operation of the automatically-acting devices for severing the paper are concerned any form of retracting device for the movable knife other than the particular one shown may be employed. It is also to be understood that the employment of the particular construction in the form-block and means for supporting it herein shown are not essential to the successful carrying out of my invention, and that the form-block may be rotated by power instead of by the operator without changing the general results obtained by the novel features of construction herein claimed.

The devices for moistening the paper strip

C, which has been previously pasted or gummed upon one side, will now be described.

Q, Fig. 1, indicates a water tank or receptacle sustained from the frame-standards A A, and herein shown as located between said standards at the rear of the lower part of the machine.

R is a roller mounted over the tank and dipping at its lower part into the water contained in said tank. The paper strip C passes from the reel E over a guide-roller,  $D^3$ , which is located at one side of the roller R, then over the upper part of said roller R, with its pasted or gummed surface in contact with the said roller, and then around the guide-roller  $D^2$ , from which it passes over the guide-rollers  $D'$  and D to the cutting devices. As the paper strip is drawn forward over the roller R, the latter is turned by or with the strip, and the water carried upward thereby thus applied to the gummed or pasted surface of the strip.

I claim as my invention—

1. A paper-cutting device for box-making machines, comprising a stationary cutter, a movable cutter, a spring actuating the movable cutter, a detent holding the movable cutter in its retracted position, a form-block, and a cam connected and turning with the form-block and having operative connection with the said detent, whereby the movable cutter may be released at a desired time, substantially as described.

2. A paper-cutting device for box-making machines, comprising a stationary knife or cutter, a movable cutter, a spring actuating the movable cutter, a detent engaging the movable cutter for holding the latter retracted, a rotating form-block, a cam connected and turning with the form-block, and an arm connected with and moving the detent and engaging the cam, substantially as described.

3. The combination, with a stationary cutter, of a movable cutter, a spring for actuating said movable cutter, a detent for holding said movable cutter retracted, comprising a swinging arm and a spring-dog pivoted to said swinging arm, a rotating form-block, a cam connected and turning with the form-block, and an arm connected with the detent and engaging the said cam, substantially as described.

4. The combination, with a stationary cutter, of a movable cutter, a spring for actuating the movable cutter, a detent for holding the movable cutter retracted, a rotating form-block, a cam turning with the form-block and actuating the detent, and a lever for retracting the movable cutter, connected with the latter by a sliding connection, substantially as described.

5. The combination, with a stationary cutter, of a movable cutter, a spring actuating the movable cutter, a detent holding the movable cutter retracted, a rotating form-block, a cam turning with the form-block and actuating the detent, and means for retracting the



movable cutter, comprising a pivoted arm, N', a bar, O, pivoted to the said arm and connected with the movable cutter by a slotted connection, a spring engaging said arm N' for  
5 holding the latter in position to allow the forward movement of the cutter, and means connected with the said arm N' for turning the latter about its pivot, substantially as described.

10 6. The combination, with a stationary cutter, of a movable cutter, a spring actuating the movable cutter, a detent engaging the movable cutter for holding the latter retracted, a rotating form-block, a cam turning  
15 with the form-block and actuating the detent,

a bell-crank lever, N, a connecting-bar, O, pivoted to the said bell-crank lever and having a slot-and-pin connection with the movable cutter, an actuating-lever, M, engaging the said bell-crank lever, and a spring engaging  
20 the bell-crank lever for holding the latter in position to allow the movement of the cutter, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence  
25 of two witnesses.

MARK D. KNOWLTON.

Witnesses:

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O. N. WILLIS.