

C. Montague,
Paper Cutter.

No. 98,611.

Patented Jan. 4, 1870.

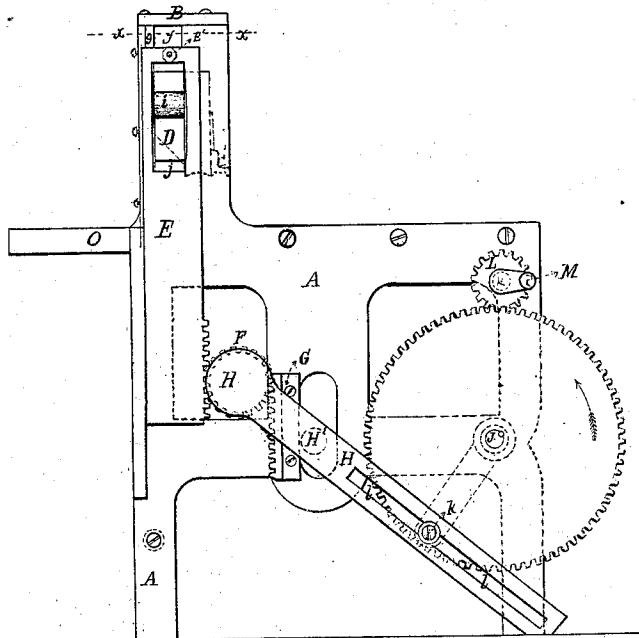


Fig. 1.

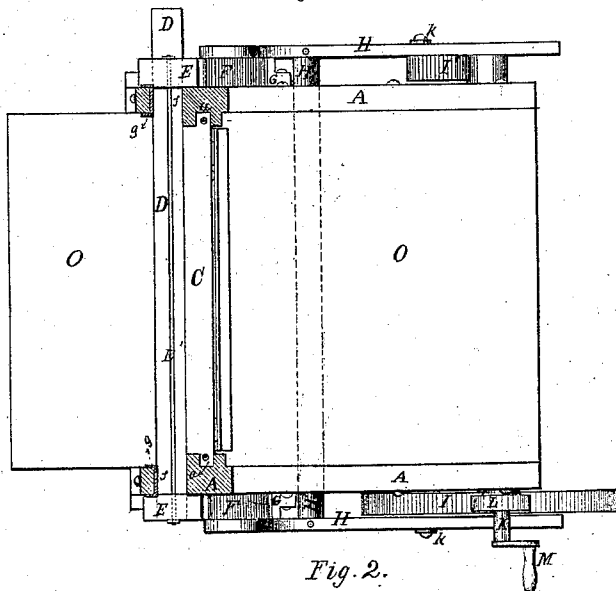


Fig. 2.

Witnesses.

N. C. Lombard
D. W. Hanson

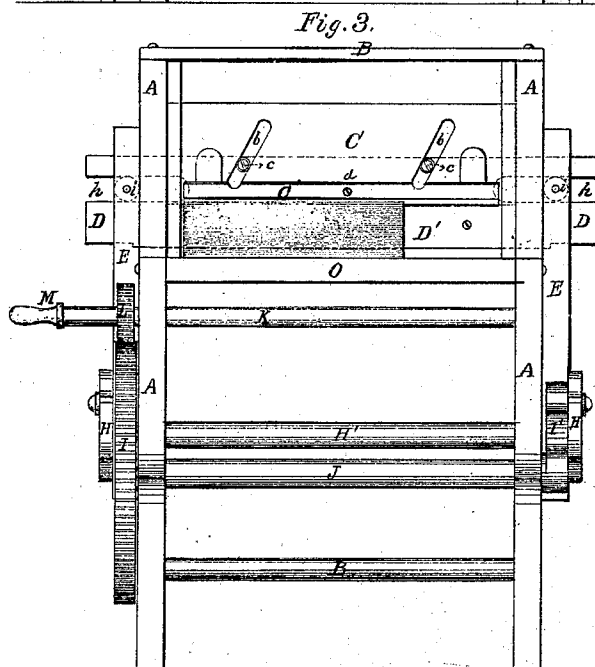
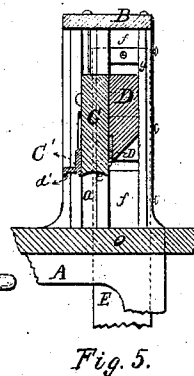
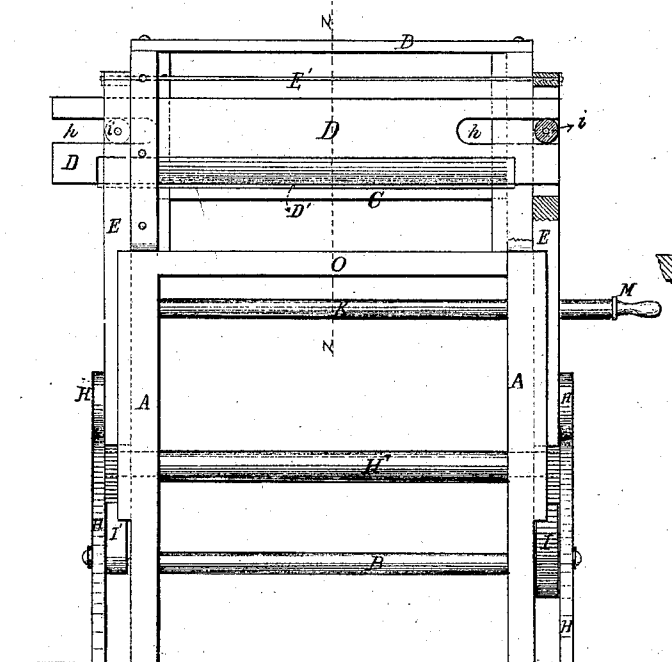
Inventor.

Charles Montague

*C. Montague,
Paper Cutter.*

No. 98611.

Patented. Jan. 4. 1870.



Witnesses.

N. C. Lombard
D. B. Hanson

Inventor.

Charles Montagne

UNITED STATES PATENT OFFICE.

CHARLES MONTAGUE, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO CYRIL C. CHILD, OF SAME PLACE.

IMPROVEMENT IN PAPER-CUTTING MACHINES.

Specification forming part of Letters Patent No. 98,611, dated January 4, 1870.

I, CHARLES MONTAGUE, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Paper-Cutting Machines, of which the following is a specification:

Nature and Objects of the Invention.

My invention relates, in the first place, to the mechanism for operating the knife-bar; and it consists, first, in the formation of a horizontal slot in either end of the knife-bar, into each of which fits a friction-roll, having its bearings in a vertical sliding bar on each side of the machine, in such a manner that when the vertical sliding bars are moved up or down the knife-bar shall move up or down with them, while, at the same time, it is free to move endwise, as it is forced in that direction by pins or studs projecting from its back side, and fitting into inclined slots in the pressure-bar.

It also consists in the use of a lever or pair of levers for operating the knife-bar, operated by a crank-pin working in a slot in the same, and causing them to vibrate upon a constantly-changing fulcrum, as will be more fully described.

My invention relates, in the second place, to the means employed for clamping the material to be cut; and it consists in so fitting and constructing the pressure or clamping bar and connecting it to the knife-bar, in such a manner that it may be automatically operated by the movement of the knife-bar, and be brought to bear upon the paper to be cut in advance of the knife, and be held firmly in that position by the force exerted to move the knife down through the paper, a large part of which force is transmitted to the clamping-bar in giving to the knife a drawing stroke, as will be more fully described.

It also consists in forming a shallow groove in the lower edge of the clamp-bar, as shown, the object of which is to facilitate the holding of the paper, which is accomplished by this device with much less pressure than with a broad flat surface.

It also consists in the use of a supplementary strip, attached to the clamping-bar in such a manner that it may be readily removed therefrom at pleasure, to allow the gage to be set

nearer to the knife when narrow strips are being cut.

Description of the Accompanying Drawings.

Figure 1 is a side elevation of a cutting-machine embodying my improvements. Fig. 2 is a sectional plan, the section being taken on line *xx* on Fig. 1. Fig. 3 is a front elevation with a portion of the frame broken away. Fig. 4 is a rear elevation, showing the machine in the act of cutting a pile of paper, and Fig. 5 is a vertical section on line *zz* on Fig. 3. Figs. 1, 2, and 3 represent the machine with the knife and clamp-bar at the extreme of their upward movement.

General Description.

A represents the side frames of the machine, secured together by the tie rods or girts B and table *o*. C is the clamp-bar, fitted to the grooves *a a* in the upper portion of the frame in such a manner that it is free to move up or down. *b b* are inclined slots, cut through the clamp-bar, in which the pins or studs *cc*, attached to the knife-bar, and carrying friction-trucks, move as the knife-bar is moved up or down, and thereby force the knife-bar to move in the direction of its length, so as to give the knife a drawing stroke, and the resistance to said movement of the knife, reacting upon the under side of the slots in the clamp-bar, serves to force said bar down onto the material to be cut with sufficient force to hold it firmly in place during the passage of the knife through the same.

The same result—viz., automatically clamping the material to be cut by the movement of the knife—may be obtained in various ways without affecting the principle of action—as, for instance, this device may be reversed by making the slots in the knife-bar and attaching the studs to the clamp-bar; or inclined lips might be used instead of the slots *b b*, and two studs and friction-trucks be used for each lip; or the knife and clamp bars might be connected together by two radius-arms, so that each should be controlled, in a measure, by the other. Therefore I do not wish to be understood as confining myself to the particular device represented in the drawing; but what I consider

as new in this part of my invention is, controlling and operating the clamping-bar by the movement of the knife-bar, and causing the knife to be moved endwise, to give a drawing cut by its action upon the clamp-bar.

C' is a detachable portion of the clamp-bar, secured to the main clamp-bar C by the screw *d*, and having a groove, *d'*, formed in its bottom surface.

The advantages of making a clamp-bar in two parts, as described, are that it gives a broader bearing when cutting large sheets, while at the same time, by removing the part C', the gage may be brought nearer to the knife for cutting narrow strips of paper.

The under edge of the clamp-bar C is also grooved, as shown at *e* in Fig. 5. This arrangement of corrugating the under surface of the clamp-bar I have found to be very effective in holding the paper, especially when cutting soft elastic paper, as it holds the paper much firmer and with less pressure than if the under edge of the clamp-bar were a broad flat surface.

D is the knife-bar, to the lower edge of which is bolted the knife D'. The knife-bar D is made somewhat longer than the width of the frame, and slides through the slots *ff* in the frame, said slots being fitted with the gibbs *g g*, and provided with set-screws for adjusting the same. The knife-bar D is also provided with a slot, *h*, at either end, in which the friction-trucks *i i* roll as the knife-bar is moved in the direction of its length by the action of the studs *c c* upon the inclined slots *b b* in the clamp-bar C.

The trucks *i i* are mounted in slots *j j*, in the upper end of the vertical bars E, fitted to slide in bearings, provided for the purpose, on either side of the frame, and connected together at their top ends by the tie-rod E', and so fitted to the knife-bar that said bar is free to move endwise through said slots *j j* at the same time that it is being moved up or down by the action of the vertical bars E upon it.

The vertical sliding bars E have rack-teeth formed on their back edges near their lower ends, by which they are moved up and down, by the action of the pinions F F on the ends of the levers H H.

G G are racks, bolted to the frames just the distance of the diameter of the pitch-circle of the pinion F, back of the pitch-line of the rack, on the lower end of the bars E, so that while the teeth in the back side of the pinion F are working in the teeth on the stationary racks, the several teeth of which successively serve as fulcrums to the levers H, the teeth on the front sides of the pinions F shall act upon the teeth cut in the lower ends of the bars E, and move them up or down. The rear ends of the levers H H, of which the pinions F form a part, are moved up and down by the action of the crank-pins *k k*, working in the slots *ll*, formed in said levers. The levers H H are connected together by the tie-rod H'.

K is the driving-shaft, to which power may

be applied by means of the crank M; or a pulley may be applied in the place of the crank M, and a belt applied to drive the machine by steam or other power. The shaft K is provided with a pinion, L, which acts upon the large spur-gear I, to revolve the shaft J. The gear I and the crank I', on the opposite end of the shaft J, are provided with crank-pins *k k*, which travel in the slots *ll* in the levers H H, and, by their revolution, cause the levers H H to vibrate up and down.

The gear I must be revolved in the direction indicated by the arrow, when it will be seen that the crank-pins *k k* are acting upon that portion of the levers H H farthest from their fulcrums, while the knife is descending; and during the latter portion of the stroke, as the knife approaches the table, the crank is in such a position with relation to the lever that it acts practically like a toggle-joint, and exerts an immense power just when it is needed.

Another peculiarity of this arrangement of the mechanism for operating the knife, is that the crank-pins *k k* move through an arc of about two hundred and forty degrees of the circle of its revolution while the knife is descending and doing its work, and only about one hundred and twenty degrees while the knife is being raised.

The operation of my improved machine is as follows: The several parts of the mechanism being in the position shown in Fig. 1, the material to be cut is placed on the table, under the knife, and adjusted to position in the usual manner, when the machine is set in motion, and, by the action of the crank-pins *k k* upon the levers H H, the knife-bar and clamp-bar are made to descend in a vertical line until the clamp-bar rests upon the paper, the edge of the knife being about an inch, more or less, above the lower edge of the clamp-bar, as shown in dotted line in Fig. 1. A continuation of the motion of the crank-shaft will cause the knife-bar to continue to descend; but as the clamp-bar is prevented from moving farther, the knife-bar must move in an oblique direction through the paper, the knife being forced in the direction of its length by the action of the studs *c c* upon the lower inclined planes formed by cutting the slots *b b* through the clamp-bar, while at the same time the resistance to the movement of the knife, reacting upon the clamp-bar, forces it down upon the paper, so as to hold it firmly in its place during the passage of the knife through the same. A continued revolution of the crank-shaft moves the knife-bar and clamp-bar up again to the starting-point during about one-third of the revolution of the crank-shaft.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. So combining the knife-bar D with the clamping-bar C that said knife-bar shall be forced in the direction of its length by the clamping-bar, substantially as described.

2. So combining, with the knife-bar D, the clamping-bar C that it may be automatically controlled and operated by the movements of the knife-bar D, substantially as described.

3. The levers H H, working upon a constantly-changing fulcrum to impart a reciprocating motion to the bars E E, when said levers are operated by the crank-pins k k, working in the slots l l, substantially as described.

4. A clamping-bar for holding paper while it is being cut, having its lower or holding

surface corrugated or grooved, substantially as described, for the purpose specified.

5. The clamping-bar C, constructed in two parts, substantially as described.

Executed at Boston, this 27th day of November, 1869.

CHARLES MONTAGUE.

Witnesses:

N. C. LOMBARD,
D. B. HANSON.