

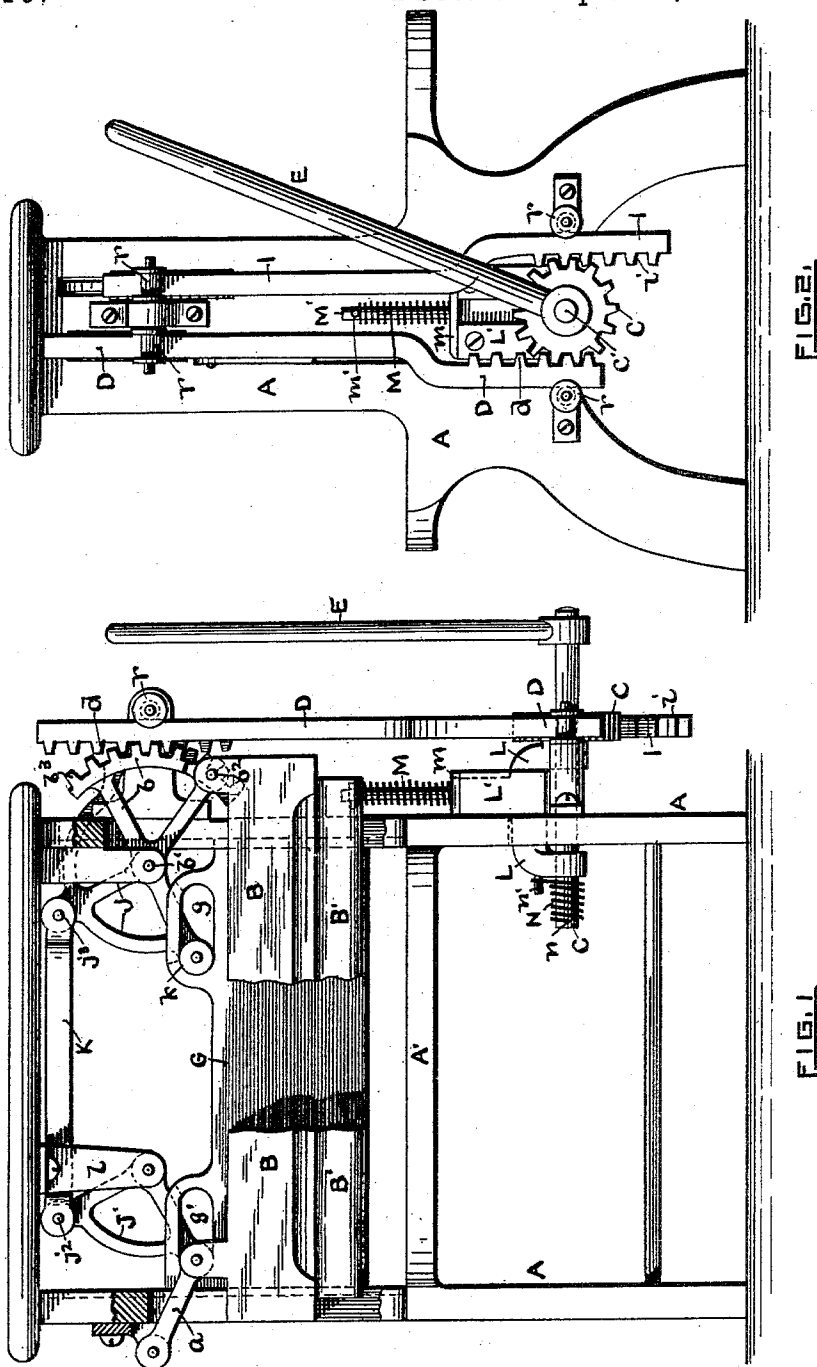
(No Model.)

2 Sheets—Sheet 1.

L. W. MORSE.
PAPER CUTTING MACHINE.

No. 425,519.

Patented Apr. 15, 1890.



WITNESSES:

H. C. Thurston
A. Murphy

INVENTOR,

Leonard W. Morse

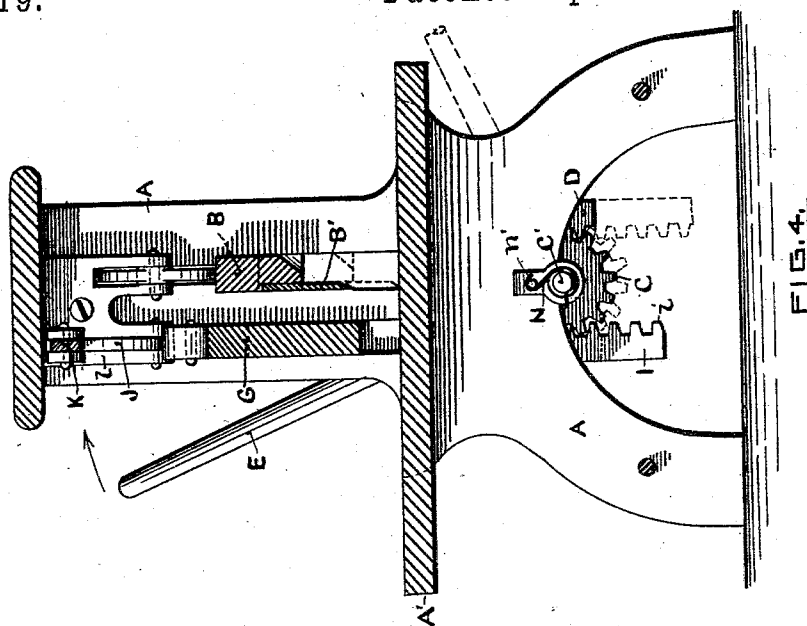
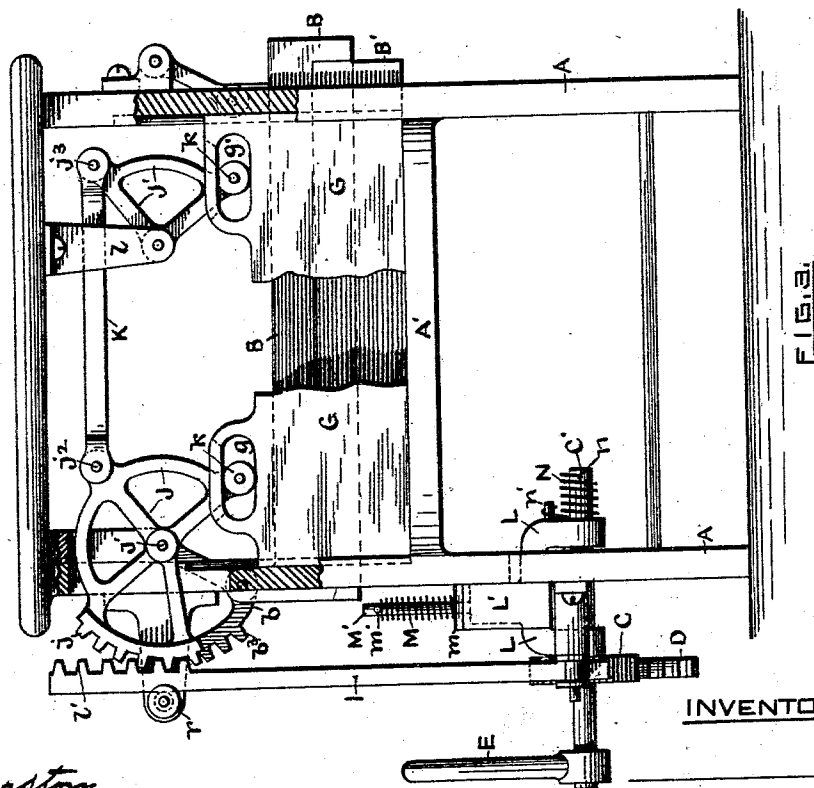
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UNITED STATES PATENT OFFICE.

LEONARD W. MORSE, OF MYSTIC RIVER, CONNECTICUT.

PAPER-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 425,519, dated April 15, 1890.

Application filed January 5, 1887. Serial No. 223,418. (No model.)

To all whom it may concern:

Be it known that I, LEONARD W. MORSE, of Mystic River, in the county of New London and State of Connecticut, have invented a new and useful Improvement in Paper-Cutting Machines; and I do hereby declare that the following specification, taken in connection with the accompanying drawings, forming a part of the same, is a full, clear, and exact description thereof.

The invention hereinafter described is designed as an improvement upon the paper-cutting machine shown and described in the Letters Patent No. 245,008, dated August 2, 1881, granted to me, and has for its object to simplify the mechanism employed to operate the knife-bar and clamp-bar, and at the same time to increase the power applied to said bars for the performance of the work required.

The invention consists in certain novel combinations of operating mechanism, which will be first fully described, and then specified in the claims hereunto annexed.

Referring to the accompanying drawings, Figure 1 represents in front elevation a machine embodying my improvement with portions of the knife, knife-bar, and of the frame of the machine broken away, and showing the position of the parts with the knife-bar and clamp-bar raised. Fig. 2 shows an end view of the same. Fig. 3 is a rear view of the machine with portions of the clamp-bar and of the frame broken away, and representing the position of the parts with the knife-bar and clamp-bar depressed. Fig. 4 represents a central vertical section of the parts shown in Fig. 1.

A is the frame of the machine, and A' the bed or platform upon which the pile of paper or other material to be cut is placed.

B is the knife-bar, and B' the longitudinal knife secured thereto. The knife-bar is connected to the top of the main frame by means of the link *a* at one end of the bar and the bell-crank lever *b* at the other end, said bell-crank lever being pivoted to the frame at *b'* and to the knife-bar at *b²*, as shown in Fig. 1. An up-and-down movement is given to the knife-bar by means of the toothed gear C, mounted upon the operating-shaft C'. This

gear engages with the rack *d* upon the bar D, and the upper end of this bar is provided with the rack *d'*, which engages with the segmental gear *b³* upon the bell-crank lever *b*. The power to work the knife-bar may be derived from the hand-lever E or from a suitable pulley-and-clutch connection, as set forth in my prior patent. As will be apparent, the rocking of the shaft by the hand-lever or by the power-connection will turn the gear C and give movement to the bar D, which movement will be transmitted to the knife-bar through the geared bell-crank lever *b*, and it will also be evident that the knife-bar in descending will, by reason of the bell-crank connection at one end and the link-connection at the other, make the necessary "draw cut" required in this class of machines.

G is the clamp-bar, located, as is usual, directly in rear of the knife-bar and with its lower edge occupying a lower plane than the edge of the knife, as shown in Fig. 1. The ends of the clamp-bar are fitted in suitable grooves or slots in the frame, and the bar is arranged to have an up-and-down movement therein for alternately clamping and releasing the pile of sheets to be cut. The means for giving movement to this clamp-bar are as follows: Upon the opposite side of the gear C from the bar D is arranged another bar I, having at its lower end the rack *i*, which engages with the gear C, and at its upper end another rack *i'*, which engages with a segmental gear *j* upon the bell-crank lever J. This bell-crank lever is pivoted to the frame of the machine at *j'*, and at its free end is provided with the friction-roller *k*, which works in the elongated slot *g* upon the upper edge of the clamp-bar G, as shown in Figs. 1 and 3. At the other end of the clamp-bar is another similar slot *g'*, in which works the friction-roller *k'* upon another bell-crank lever J', which latter is pivoted to the hanger *l*, extending downward from the main frame, as shown in Figs. 1 and 3. A connecting-rod K connects the bell-crank levers J and J', being pivotally attached to each at *j²* and *j³*, respectively. The rack-bars D and I are held up to their work preferably by friction-rollers *r*, mounted upon suitable studs secured to the frame of the machine, as shown in the draw-

ings. It will be apparent that when the shaft C' is rocked the gear C, in addition to causing the movement of the knife-bar through the bar D and the bell-crank-lever connection, will also communicate motion to the bar I, which, through the bell-crank levers J and J', will be transmitted to the clamp-bar, the arrangement being such that a rocking of the shaft C' in one direction will cause both the knife-bar and the clamp-bar to descend, and a rocking in the other direction will cause both bars to be raised. Thus when the shaft is rocked in the direction to move the bar D and the knife-bar downward the gear C will cause the bar I to be moved upward, which will raise the geared end of the bell-crank lever J and depress the opposite end, which is connected with the slot in the clamp-bar, a similar movement being imparted to the bell-crank lever J' through the connecting-rod K, the result being to give the necessary downward movement to the clamp-bar. As the two rack-bars D and I mesh upon opposite sides of the same gear C, and must therefore receive motion in opposite directions, while the knife-bar and clamp-bar must simultaneously move in the same direction, the arrangement of the bell-crank levers b and J should be such as to effect this result.

The lower edge of the clamp-bar being below the edge of the knife, the first effect of the movement given to the operating-shaft is to clamp the pile of paper on the table, after which the further downward movement of the clamp-bar will be arrested by the resistance of the pile of paper. It is necessary, however, that the knife-bar should continue to move toward the table in order to cut the pile of sheets which have thus been clamped; and it is obvious, as explained in my prior patent, that when the clamp-bar is thus bearing hard upon the pile of paper any further rocking of the shaft C' to work the knife-bar would be liable to break the machine, for the reason that with the parts in that position any further upward movement of the rack-bar I by a revolution of the toothed gear C on the shaft C' is impossible. Consequently provision is made for enabling the operating-shaft to be moved bodily downward after the clamp-bar has brought up hard upon the pile of paper. The means employed for this purpose are substantially the same as set forth in my said prior patent, and consist in mounting the shaft C' in a movable block or bearing L, arranged to slide vertically in the guide L' on the frame. By this arrangement the gears on the gear-wheel C are transformed into levers whose fulcrums are the teeth upon the rack i, and any further rocking of the shaft C' for working the knife-bar will cause the gear C to travel along the rack, thereby moving the operating-shaft C' bodily downward, and causing the knife-bar to complete its downward movement. Thus the desired result is accomplished of causing the knife-bar and clamp-

bar to move simultaneously toward the table until such time as the pile of paper arrests the further downward movement of the clamp-bar, and thereafter causing the knife-bar to continue its downward movement independently of the clamp-bar, and also of securing a degree of pressure to be exerted upon the pile of paper equal to the force applied to drive the knife through the pile of paper, for the reason that the resistance with which the knife meets in going through the pile of paper is transmitted to the clamp-bar.

To return the shaft C' to its normal position and to effect the return or upward movement of the knife-bar and clamp-bar, two springs M and N may be employed. In the arrangement shown in the drawings the spring M surrounds a rod M' attached to the movable block L, and bears at one end upon the cross-piece m and at the other end upon the cross-pin m'. The effect of the spring M is to lift the shaft C' back to its normal vertical position. The spring N is a torsion-spring mounted upon the end of the shaft C', one end of the spring being connected with the shaft at n and the other end secured to the pin n' on the movable block L, as shown in Figs. 1 and 3. As will be obvious, the rocking of the shaft C' to cause the downward movement of the knife-bar and clamp-bar will wind up the spring N, the force of which will act to rock the shaft back again when allowed to do so, and thus raise both the knife-bar and clamp-bar to their original positions.

By the arrangement of devices for effecting the proper operation of the knife-bar and clamp-bar above described it will be seen that I have dispensed entirely with all rack-bars, gears, and operating mechanism upon one side of the machine, and have thus simplified the construction, while at the same time, by the employment of bell-crank levers for operating the knife-bar and clamp-bar, respectively, I am enabled to secure greatly-increased power for operating said bars.

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

1. The combination of a knife-bar, a geared bell-crank lever for operating said knife-bar, a rack-bar for imparting motion to said bell-crank lever, and devices, substantially as described, for giving movement to said rack-bar, substantially as set forth.

2. The combination of a clamp-bar, bell-crank levers for operating said clamp-bar, one of said bell-crank levers being provided with a segmental gear, a connecting-rod connecting said bell-crank levers, a rack-bar engaging with the segmental gear on one of said bell-crank levers for imparting motion thereto, and devices, substantially as described, for giving movement to said rack-bar, substantially as set forth.

3. The combination of a knife-bar, clamp-bar, geared bell-crank levers for operating said bars, rack-bars for giving movement to

said bell-crank levers, and a gear for operating said rack-bars, substantially as described.

4. The combination, with a knife-bar, clamp-bar, geared bell crank levers for operating
5 said bars, and rack-bars and gear for imparting a downward movement to said knife-bar and clamp-bar; of two counterbalance-springs, one of said springs serving to return the operating-shaft to its normal vertical

position, and the other spring mounted upon the operating-shaft and serving to rock said shaft to its normal rotary position, substantially as described.

LEONARD W. MORSE.

Witnesses:

W. H. THURSTON,
S. J. MURPHY.