(No Model.) 2 Sheets—Sheet 1.

A. MALM.

PAPER CUTTING MACHINE.

No. 451,333. Patented Apr. 28, 1891.

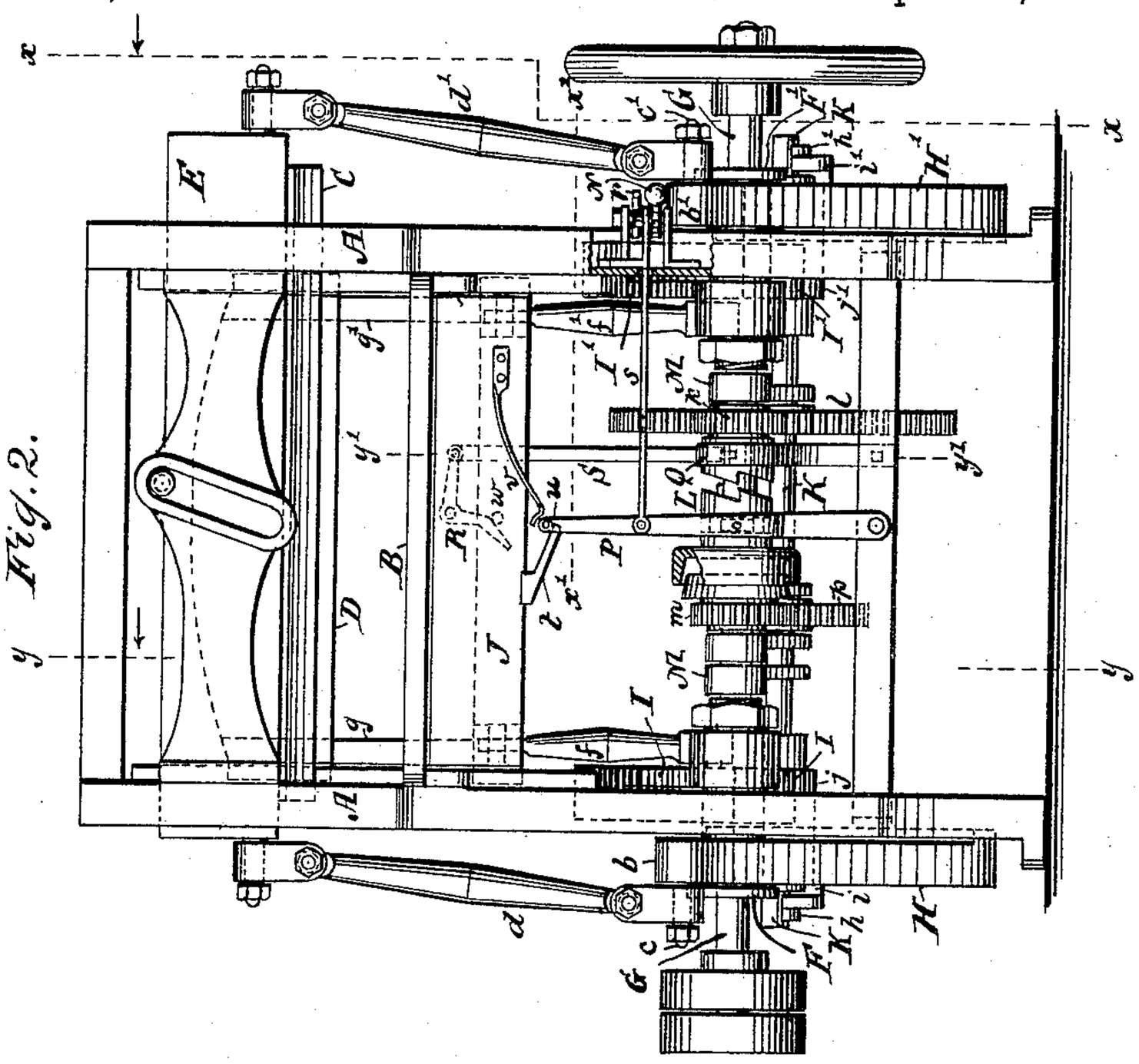

Fig. 2.

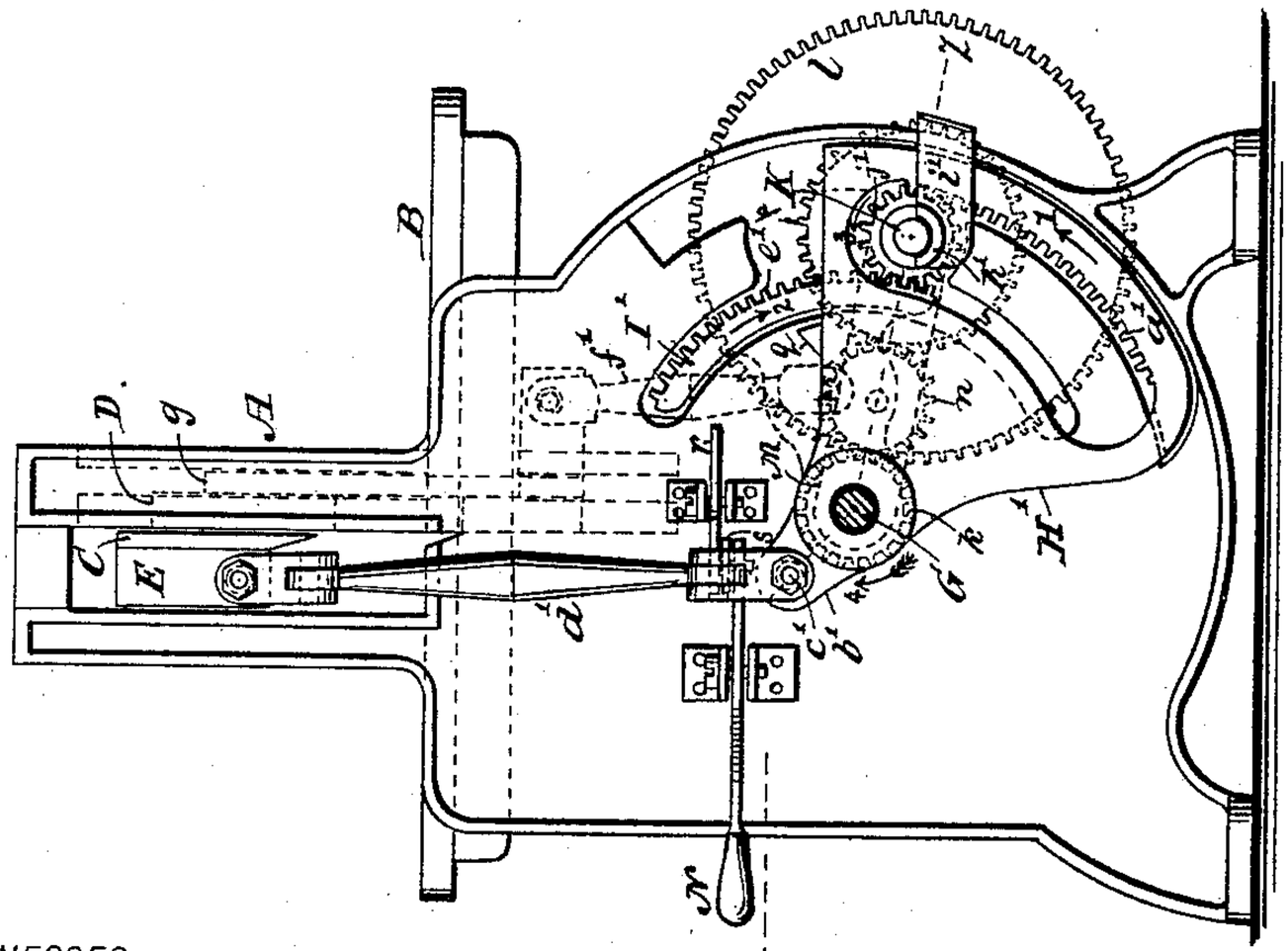

Fig. 1.

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Fig. 4.

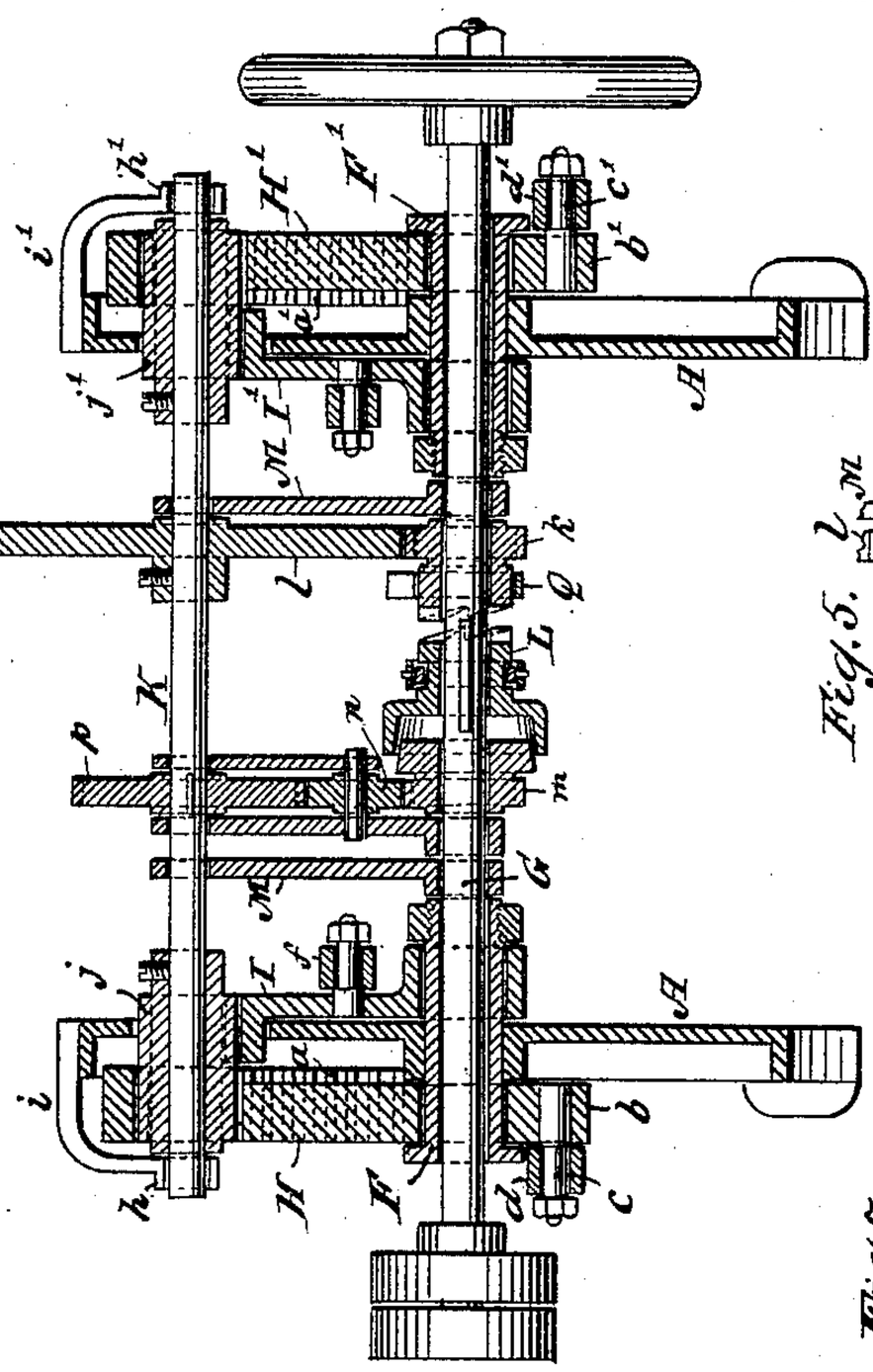


Fig. 5.

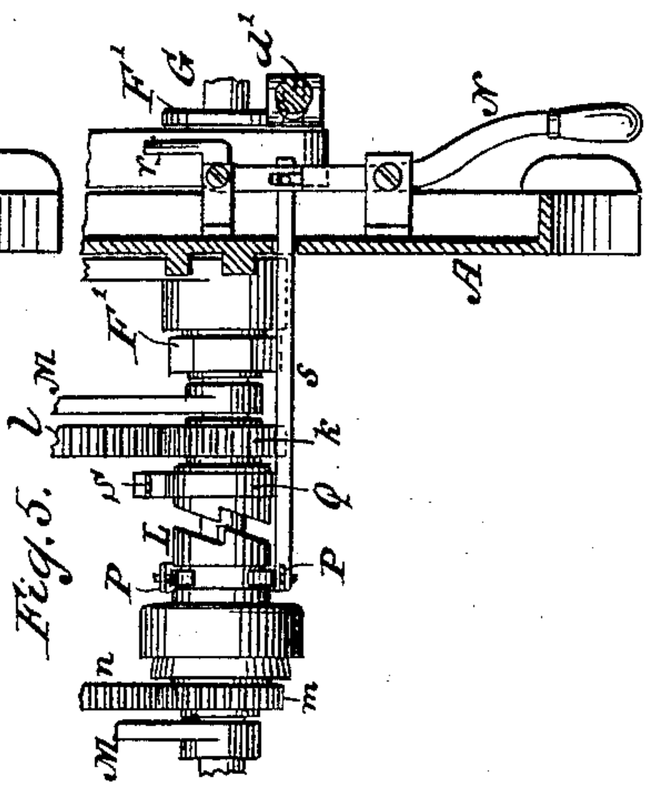


Fig. 7.

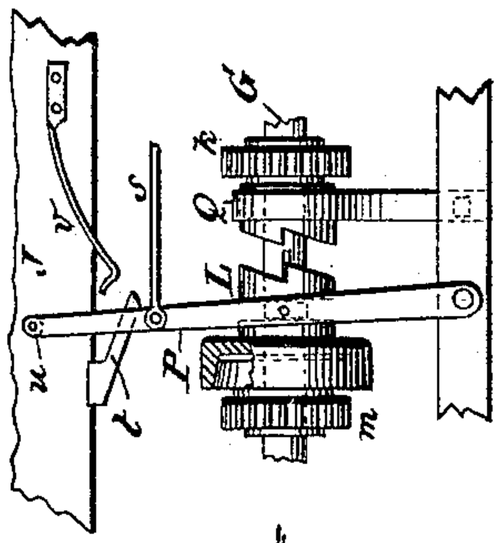


Fig. 3.

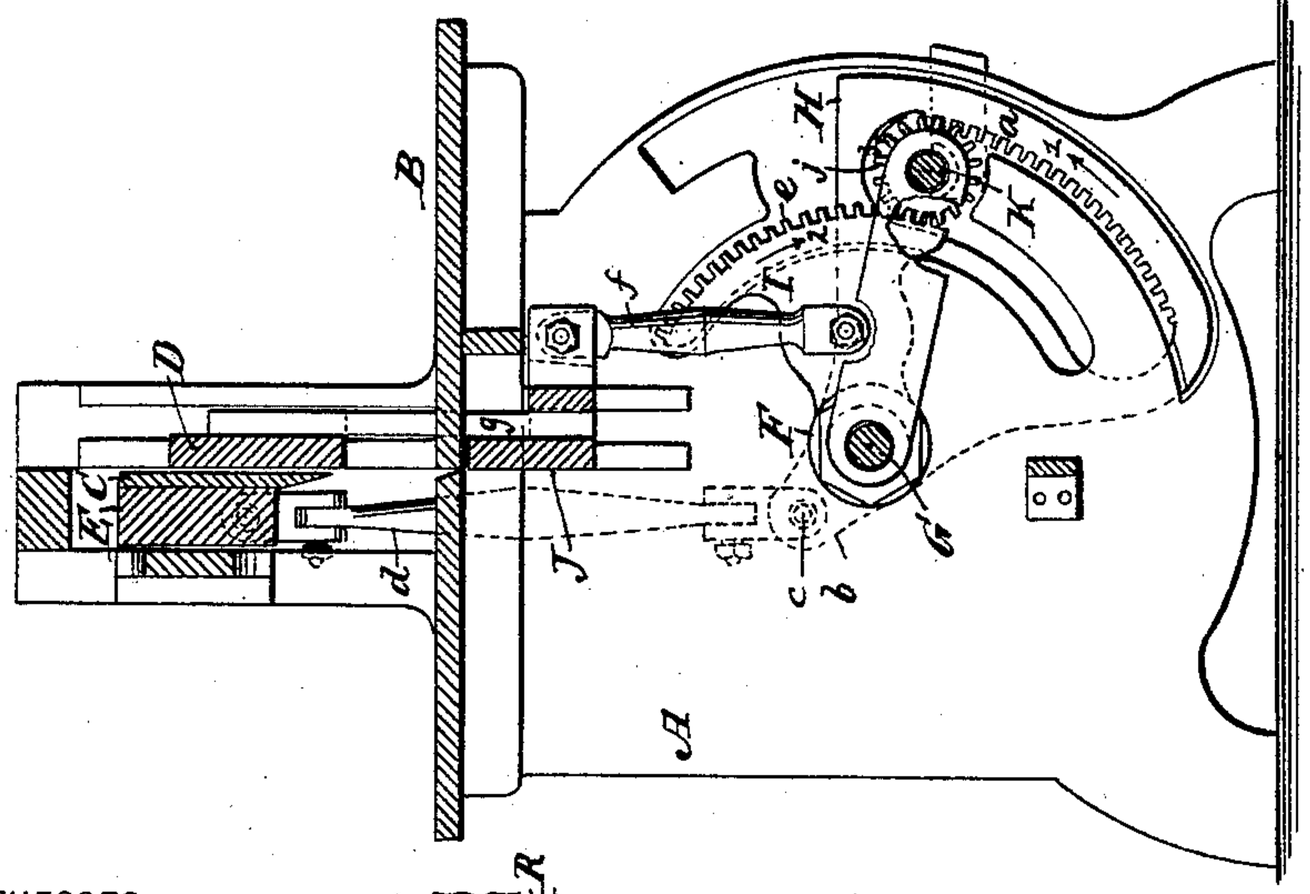
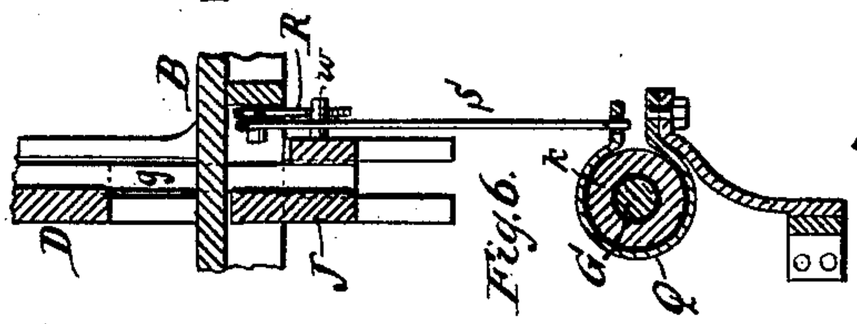


Fig. 6.



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UNITED STATES PATENT OFFICE.

ALEXANDER MALM, OF NEW YORK, N. Y., ASSIGNOR TO T. W. & C. B. SHERIDAN, OF SAME PLACE.

PAPER-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 451,333, dated April 28, 1891.

Application filed January 29, 1891. Serial No. 379,566. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER MALM, a citizen of the United States, residing at New York, in the county and State of New York, have invented new and useful Improvements in Paper-Cutting Machines, of which the following is a specification.

This invention relates to certain improvements in paper-cutting machines of that class in which both the knife and the paper-clamp are situated above the work-table and connected in such a manner that the pressure of the clamp upon the paper increases or diminishes with the resistance which is to be overcome by the knife.

The peculiar and novel construction of my paper-cutter is pointed out in the following specification and claims and illustrated in the accompanying drawings, in which—

Figure 1 represents a side elevation, partly in section, in the plane indicated by the line *x x*, Fig. 2, and looking in the direction of the arrow opposite to that line. Fig. 2 is a front elevation. Fig. 3 is a longitudinal vertical section in the plane *y y*, Fig. 2. Fig. 4 is a horizontal section in the plane *z z*, Fig. 1. Fig. 5 is a partial horizontal section in the plane *x' x'*, Fig. 2, showing those parts which are connected to the driving-shaft. Fig. 6 is a partial vertical section in the plane *y' y'*, Fig. 2. Fig. 7 is a partial front view showing the parts in a different position from that shown in Fig. 2.

In the drawings, the letter A designates the frame, which supports the working parts of my machine.

B is the work-table.

C is the knife, and D is the paper-clamp. The knife C is firmly secured to a cross-head E, from which extends a stud into an oblique slot, Fig. 2, whereby a shear cut is imparted to the knife.

In the frame A are mounted two sleeves F F', Fig. 4, through which extends the driving-shaft G, and on said sleeves, outside of the frame A, are loosely mounted the slotted segments H H', each of which is provided with teeth *a a'*, respectively, said teeth being formed on the outer edges of the slots, as seen in Figs. 1 and 2. Each of said slotted segments is provided with a short arm *b b'*, respectively, and in these arms are secured studs *c c'*, which connect by rods *d d'* with the cross-head E, so that when said segments are permitted to drop down to the position shown in Figs. 1, 2, and 3 the cross-head E occupies its highest position, and if the segments are turned in the direction of arrows 1, Figs. 1 and 3, the cross-head E is caused to move down and the knife cuts through the material placed upon the table B. On the sleeves F F', inside of the frame A, are also loosely mounted two segments I I', which are provided with cogs *e e'* on their outer edges, and which connect by rods *f f'* with a cross-bar J, which connects by slides *g g'* with the paper-clamp D. In the position shown in Figs. 1, 2, and 3 the clamp and the knife are at the upper end of their stroke; but if the segments I I' are turned in the direction of arrow 2, Figs. 1 and 3, the clamp is caused to move down so that it bears upon the material to be cut.

K is the traveling shaft, which, when the knife and the clamp are at the upper end of their stroke, rests in half-boxes *h h'*, formed at the ends of arms *i i'*, (best seen in Fig. 4,) which are firmly attached to the frame A. On this traveling shaft are firmly mounted two pinions *j j'*, Figs. 1, 3, and 4, of which the pinion *j* is in gear with the segments H and I, while the pinion *j'* is in gear with the segments H' I'. If the traveling shaft is turned in the direction of arrow 3, Figs. 1 and 3, the segments I I' are caused to move down in the direction of arrow 2, and the segments H H' are caused to move up in the direction of arrow 1, and consequently both the clamp and the knife are made to descend. As soon as the clamp strikes the paper or other material to be cut its downward movement is stopped, and by the action of the pinions *j j'* upon the segments I I' the traveling shaft K is caused to climb up until the knife begins to cut, and then the pressure of the clamp upon the paper is increased in proportion to the resistance met by the knife in cutting. After the knife has reached the lower end of its stroke the motion of the traveling shaft is reversed automatically and the knife and the clamp are

moved upward, and when they have reached the upper end of their stroke the motion of the traveling shaft is stopped automatically without interrupting the movement of the driving-shaft. These movements are accomplished by the following means: On the driving-shaft G is loosely mounted a pinion *k*, which can be thrown in gear with said shaft by a clutch-sleeve L, and which gears into a cog-wheel *l*, firmly mounted on the traveling shaft K. The driving-shaft is turned in the direction of arrow 4, Fig. 1, and if the pinion *k* is thrown in gear with said driving-shaft the traveling shaft turns in the direction of arrow 3, Figs. 1 and 3, and the knife and clamp are caused to move down. On the driving-shaft G is also loosely mounted a pinion *m*, which is geared together with the traveling shaft K by a pinion *n* and cog-wheel *p*, Figs. 1 and 4, and the pinion *m* can be thrown in gear with the driving-shaft by means of the clutch-sleeve L, and if this is done the traveling shaft is caused to turn in the direction opposite to arrow 3, and the knife and clamp are moved up. The proper relation between the driving-shaft and the traveling shaft is preserved by links M M. (See Fig. 4.) The clutch-sleeve L is connected to a hand-lever N, Fig. 5, so that it can be moved in gear either with the pinion *k* or with the pinion *m*, or so that it can be thrown out of gear with both those pinions. If the clutch-sleeve is thrown in gear with the pinion *k*, the clamp and the knife move down, and when the knife has reached the lower end of its stroke a toe *q*, which projects from the edge of the segment II′, (see Fig. 1,) strikes a bell-crank lever *r*, which connects by a rod *s* with the clutch-lever P, and by these means the clutch-sleeve L is automatically thrown in gear with the pinion *m* and the movement of the traveling shaft is reversed. This position of the clutch-sleeve and clutch-lever is shown in Fig. 7. As the clamp is moved upward a toe *t*, which projects from the slide J, strikes a pin *u*, secured in the clutch-lever P, and when the clamp and the knife have reached the top end of their stroke the clutch-lever is thrown into its central position, (see Fig. 2,) in which it is arrested by a stop *v*, and the clutch-lever is thrown out of gear with both the pinions *n* and *m*, so that the movement of the traveling shaft ceases. The hub of the pinion *k* is embraced by a strap Q, (best seen in Fig. 6,) and when the slide J reaches the upper end of its stroke a pin *w* strikes a bell-crank lever R, which connects with the strap Q by a rod S, and said strap is compressed, so that the pinion *k* cannot be moved by its frictional contact with the driving-shaft.

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

1. In a paper-cutter, the combination, with the cross-head E, the knife C, and the clamp D, of the driving-shaft G, the segmental gears II′, swinging loosely round the driving-shaft and connected to the cross-head E, the segmental gears I I′, swinging loosely round the driving-shaft and connected to the clamp D, the traveling shaft K, geared with both sets of segments H H′ and I I′, and a clutch mechanism for imparting motion in reverse directions to the traveling shaft, substantially as described.

2. In a paper-cutter, the combination, with the cross-head E, the knife C, the clamp D, and the clamp-slide J, of the driving-shaft G and suitable connections for transmitting motion from said driving-shaft to the cross-head E and to the clamp D, comprising the traveling shaft K, geared with the driving-shaft, a clutch and mechanism for imparting motion in reverse directions to the traveling shaft, and a toe *t*, connected to the clamp-slide, for throwing the clutch-sleeve in its inactive position, substantially as described.

3. In a paper-cutter, the combination, with the cross-head E, the knife C, the clamp D, and the clamp-slide J, of the driving-shaft G, suitable connections for transmitting motion from said driving-shaft to the cross-head E and the clamp D, comprising the traveling shaft K, geared with the driving-shaft, the clutch-sleeve L, and pinions *k m* for imparting motion in reverse directions to the traveling shaft, the strap Q, which embraces the hub of the pinion *k*, the bell-crank lever R, pin *w*, and rod S, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ALEXANDER MALM.

Witnesses:
J. VAN SANTVOORD,
E. F. KASTENHUBER.