(No Model.) 4 Sheets—Sheet 1.

H. BARTH & E. LIETZE.

PAPER CUTTING MACHINE.

No. 390,151. Patented Sept. 25, 1888.

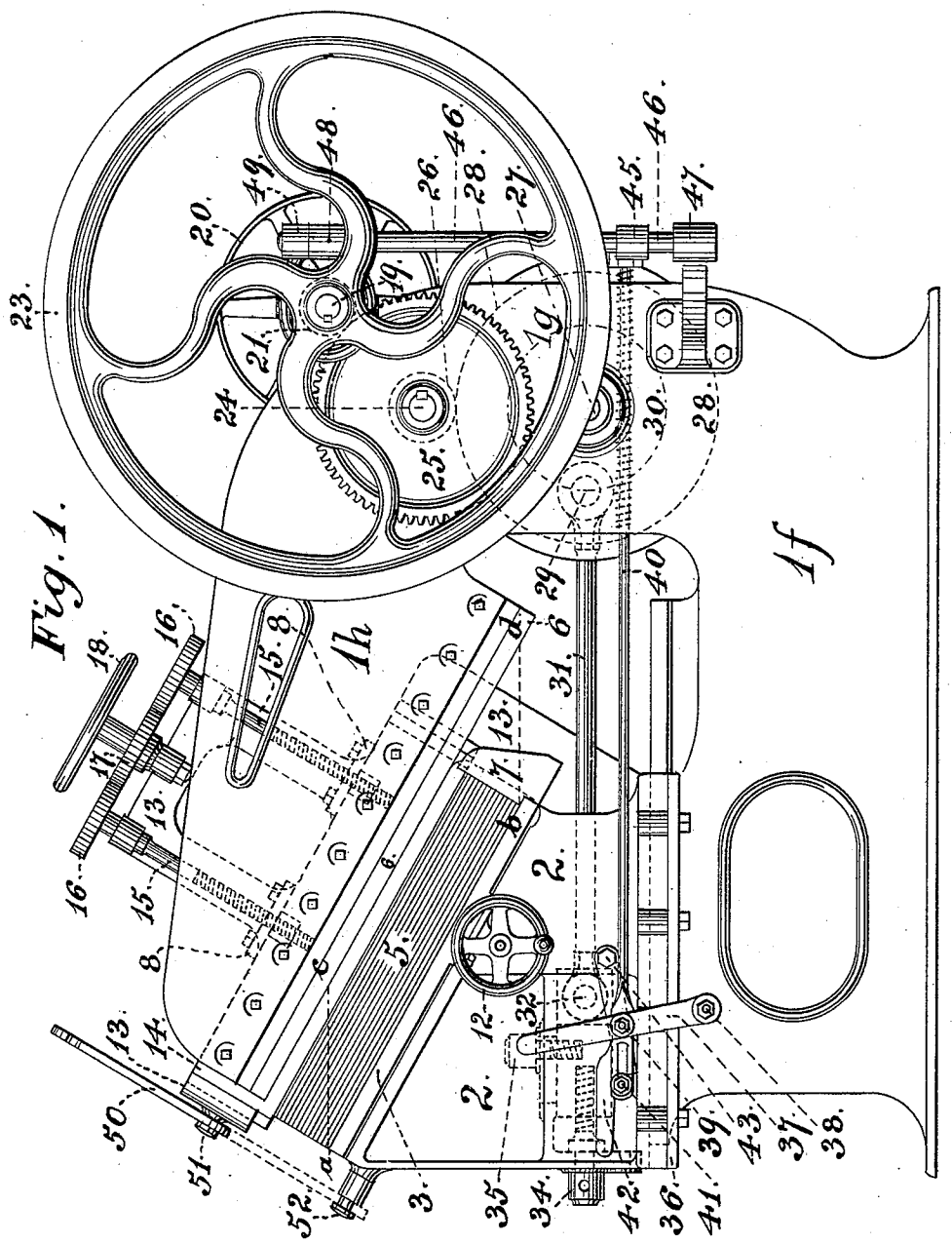


Fig. 1.

Witnesses.
Ed. J. Baechle
Wm. Bloebaum

Inventors.
Henry Barth.
Ernst Lietze.

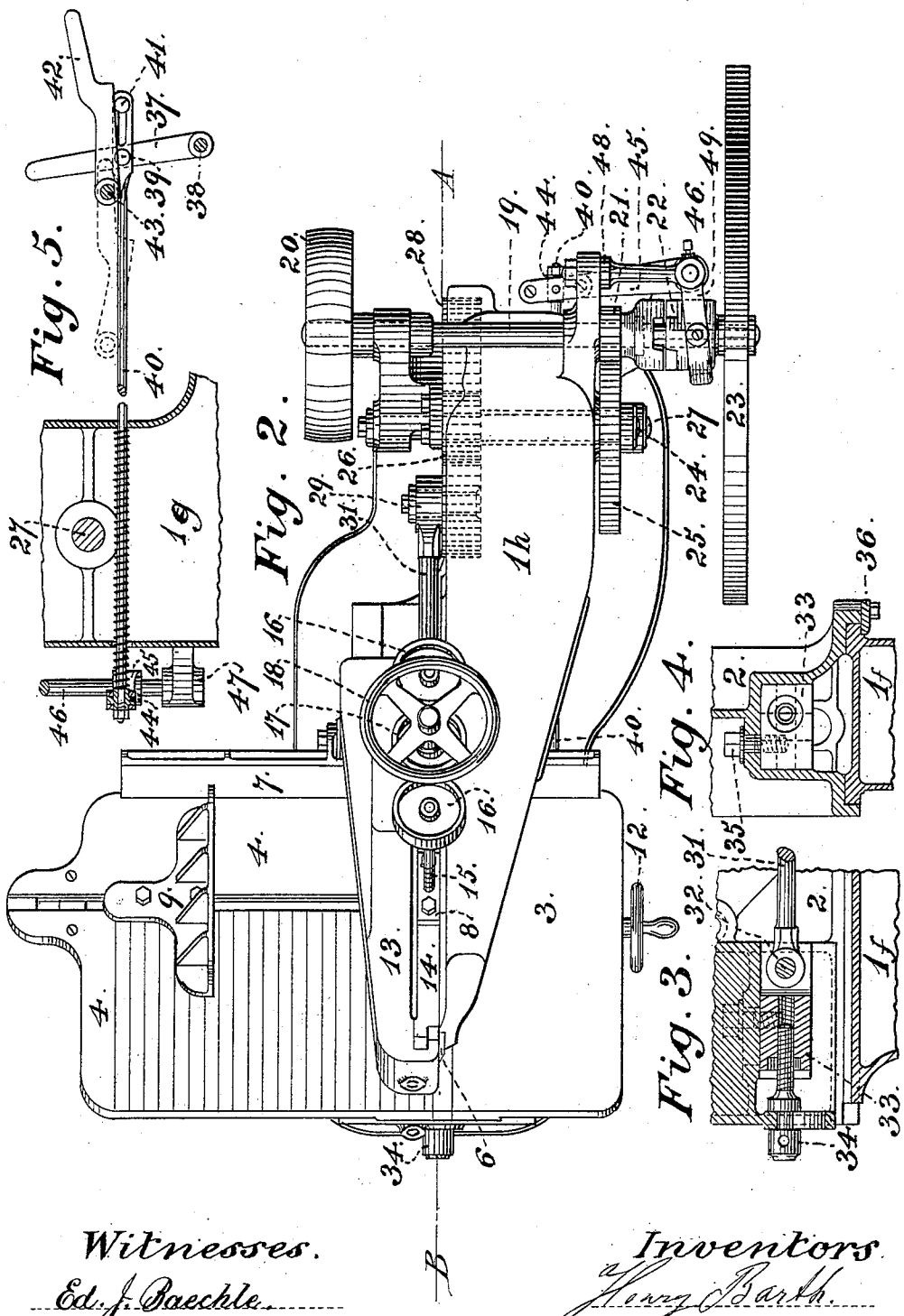
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Ed. J. Baechle.
Wm. Bloebaum.

Inventors.
Henry Barth.
Ernst Lietze.

N. PETERS. Photo-Lithographer, Washington, D. C.

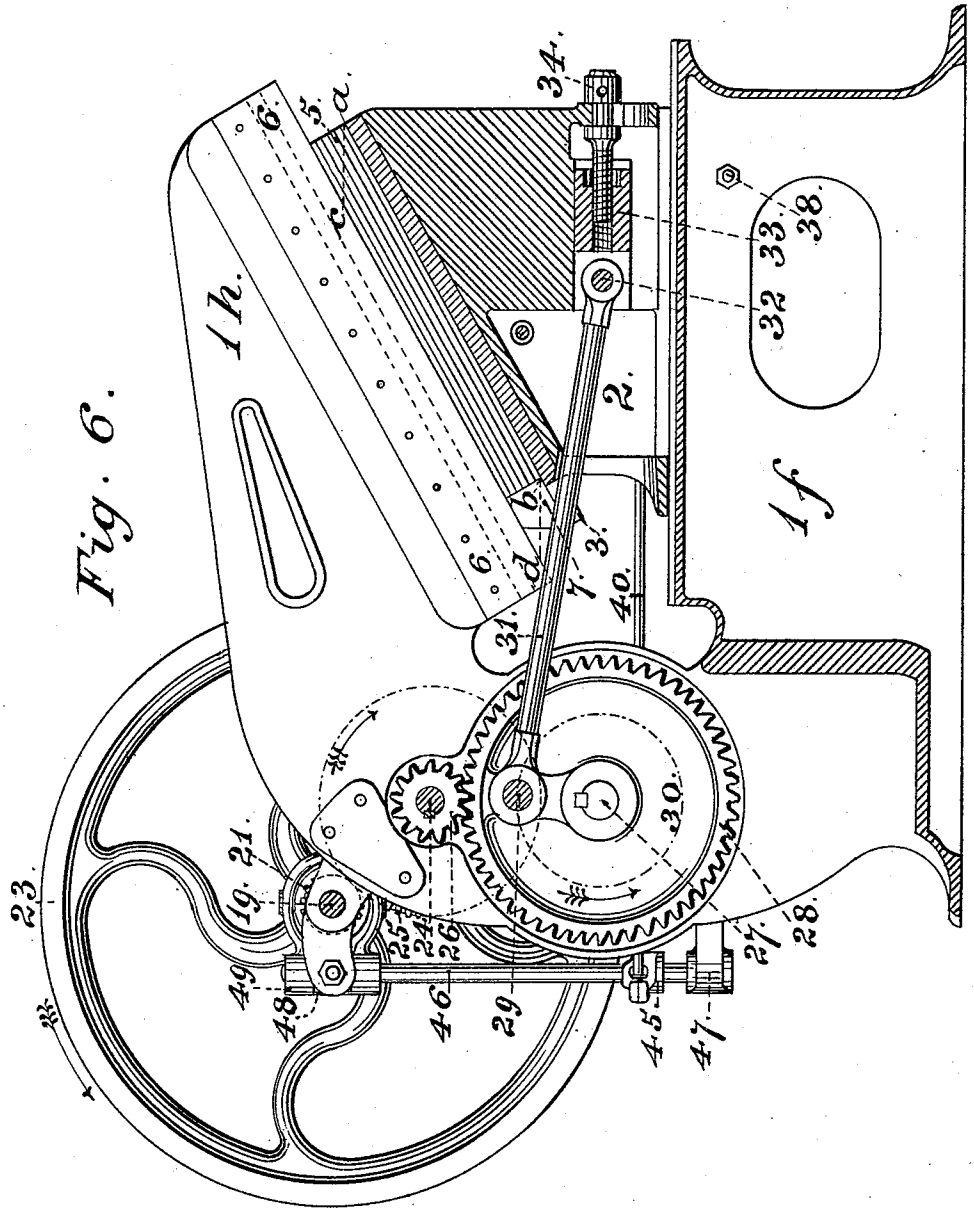
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H. BARTH & E. LIETZE.

PAPER CUTTING MACHINE.

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Fig. 6.



Witnesses.
Ed. J. Baechle.
Wm Bloebaum

Inventors.
Henry Barth.
Ernst Lietze.

N. PETERS. Photo-Lithographer, Washington, D. C.

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H. BARTH & E. LIETZE.

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Fig. 8.

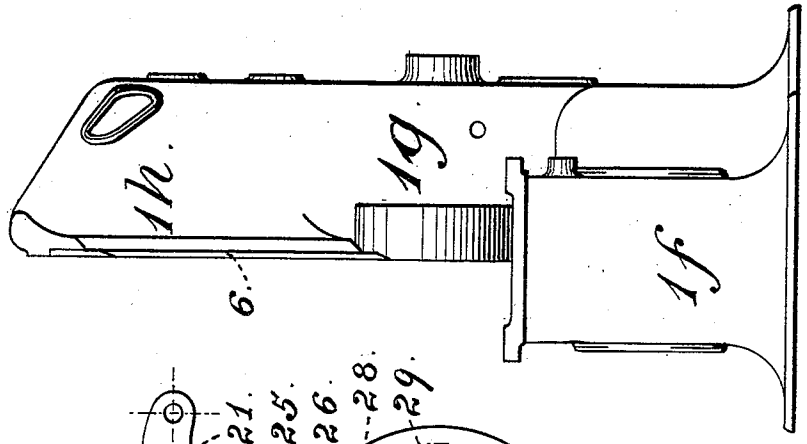
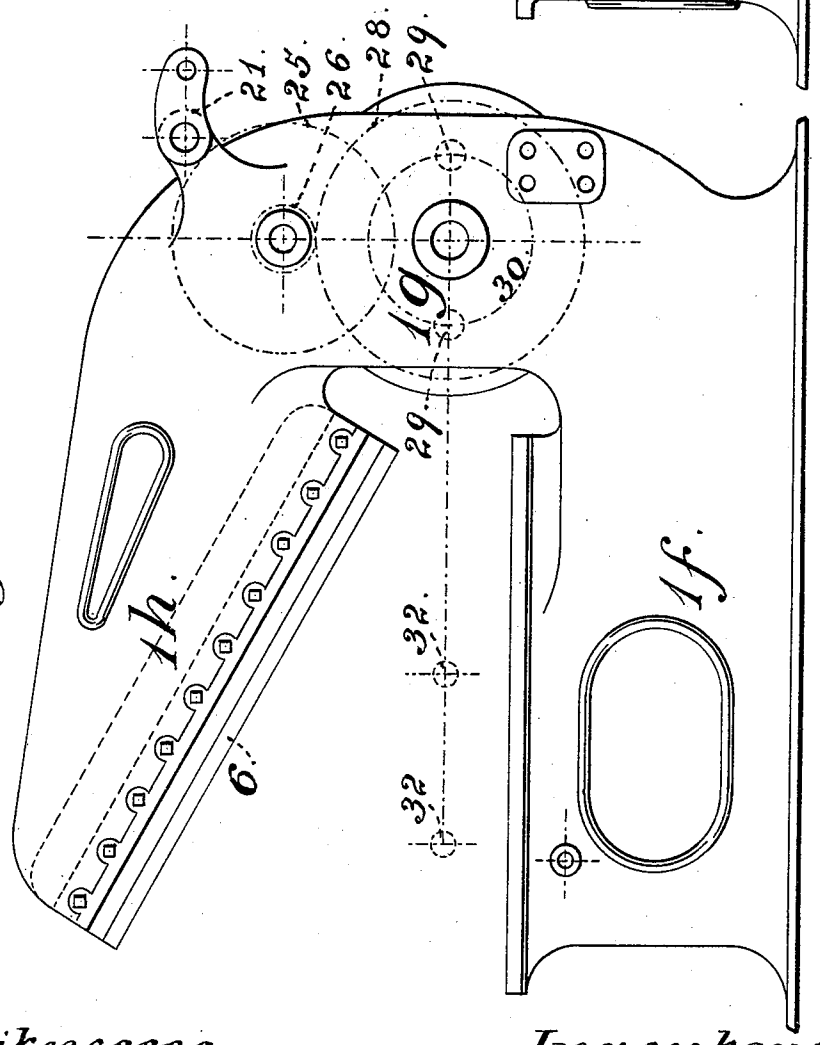


Fig. 7.



Witnesses.
Ed. J. Baechle.
Wm Bloebaum.

Inventors.
Henry Barth.
Ernst Lietze.

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

HENRY BARTH AND ERNST LIETZE, OF CINCINNATI, OHIO.

PAPER-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 390,151, dated September 25, 1888.

Application filed July 15, 1886. Serial No. 208,147. (No model.)

To all whom it may concern:

Be it known that we, HENRY BARTH and ERNST LIETZE, both citizens of the United States, and both residing at the city of Cincinnati, in the county of Hamilton and State of Ohio, have invented a new and useful Paper-Cutter, of which the following is a specification.

Our invention relates to improvements in machines in which piles of sheets of paper are cut into smaller sheets, and in which packs of paper, books, pamphlets, &c., are trimmed by placing the articles to be cut on a carriage that is moved against a stationary knife.

The objects of our improvements are, first, to devise a paper-cutter in which the knife is held in such a manner that the paper can be placed upon the table from one end of the knife as well as from the front or back of the same; second, to provide an arrangement to facilitate the straightening of the packs of paper to be cut or trimmed; third, to afford a compact and substantial frame of the machine, and, fourth, to design an automatic operating device for stopping the cutting motion of the machine at a certain point without annihilating the mechanical work stored up in the fly-wheel. We attain these objects by the mechanisms illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of the entire machine; Fig. 2, a plan or top view of the machine; Figs. 3 and 4, sectional detailed views, showing the cross-head or block by means of which the connecting-rod of the cutting motion is attached to the main slide 2; Fig. 5, a detailed view illustrating the automatic stopping device; Fig. 6, a longitudinal sectional view of the machine on the vertical plane A B, Fig. 2, which passes through the edge of the knife; Fig. 7, a front elevation, and Fig. 8 a side view, of the frame of the machine.

Similar letters refer to similar parts throughout the several views.

The frame of the machine is a hollow casting. On the same three distinct parts may be distinguished: first the lower horizontal part, 1 *f*, Figs. 6 to 8, forming the base, being provided at its upper surface with ways for the carriage 2 to slide upon; secondly, the vertical column-like part 1 *g*, to which the journal-boxes of the main shaft 27 of the intermediate shaft, 24, and of the fly-wheel shaft 19 are applied, and, thirdly, the oblique arm or beam 1 *h* above the base, to which the knife 6 is bolted. The beam 1 *h* is united by one of its ends with the column-like part 1 *g*, and extends freely over the ways on which the carriage 2 slides, so that the space under the knife is accessible from one end as well as from the front or back. The edge of the knife forms an acute angle with the top surface of the ways on the base, and is located in the vertical plane passing the longitudinal center line between the ways, in order to cause the principal stress, due to the force required for cutting the paper, to be in this vertical plane, and to have no component acting under an angle to said plane, which would cause flinching. The carriage or slide 2, Fig. 1, has an oblique or inclined top surface, to which the front part, 3, and rear part, 4, Fig. 2, of the table are secured, and with it, in one piece, the gallow-frame 13 is cast. The oblique arm of the latter runs parallel with the table, and is provided with guides for the bar 14 of the paper-clamp to slide in. The table is fitted with a stationary side guide, 7, and a movable back guide, 9, the latter being operated by means of the move-screw and the hand-wheel 12 in a usual manner. In a groove left between the two parts of the table a square wooden stick, Fig. 2, is placed, to prevent the edge of the knife from getting dull.

The paper to be cut is placed upon the oblique table and pressed together by means of the paper-clamp, which is constructed as follows: The clamping-bar 14, Fig. 1, is furnished with two nuts, 8 8, in which the screws 15 15 operate. These screws are journaled, near their upper ends, in projections prepared for this purpose at the upper extension of the gallow-frame 13, in such a manner as to be incapable of longitudinal motion, and the spur-wheels 16 16 are keyed to their upper ends. The intermediate wheel, 17, is fastened to the hub of the hand-wheel 18 and gears with the wheels 16 16. The hand-wheel 18 is turnable on a stationary pin, which is secured to the upward extension of the gallow-frame 13, and when it is turned the screws 15 15 will be turned also, and the clamping-bar 14 either moves against the paper and compresses the

same or it moves from the paper, according to the direction in which the hand-wheel is turned.

The inclination of the table facilitates greatly in straightening the paper. In all paper cutters in which the knife is stationary, and in which the paper is placed upon a carriage and moved against the knife to be cut, built previous to ours the table had a horizontal position.

The slide 2 is provided with the two pins 51 and 52. The first one, 51, is located at the center of the end of the oblique arm of the gallow-frame 13 and serves as a pivot for the swiveling bar 50. The second one, 52, is placed a little below the table in the same vertical plane as the first one. When paper is to be put on the table or to be removed from the same, the swiveling bar 50 is to be moved upward to occupy the position in which it is drawn in full lines in Fig. 1, and before the paper is compressed the said bar may be swung around to the position in which it is indicated in Fig. 1 by dotted lines, where a notch in the bar will hook over the pin 52. This is not absolutely necessary, but it adds to the strength of the oblique beam of the gallow-frame 13.

In order to cut the paper, the carriage 2, with the compressed paper, is moved toward the right, by a mechanism which we will describe hereinafter, until the point *a* of the paper will come in contact with the point *c* of the edge of the knife and the point *b* will meet the point *d*.

In paper-cutters previously invented the paper is either stationary and the knife movable or the knife is stationary and in a horizontal position, and the paper, being placed upon a carriage which slides on an inclined plane, is moved obliquely upward against the knife. The latter arrangement has a certain similarity with that in our machine, as the knife is stationary and the paper is moved against the knife; but the paper, the table, and the support of the table are to be lifted in this arrangement, which requires an expenditure of mechanical work. This lifting is avoided in our machine, as the knife stands oblique and parallel with the paper, and every point of the paper and every point of its support are moved in a horizontal line.

The reciprocating sliding motion of the carriage is derived from the fly-wheel shaft 19, which may be driven by a belt passing around the pulley 20, or may be turned by hand if the fly-wheel 23 is furnished with a handle for this purpose. Besides the pulley 20 and the fly-wheel 23, the pinion 21, which also forms one part of a clutch, and the second sliding part, 22, of a clutch are placed on the shaft 19. The pinion 21 turns loosely on the shaft, and is prevented from moving longitudinally at one side by the frame and at the other side by a collar of the shaft. The shaft is fitted with a feather, and the sliding part 22 of the clutch is prepared with a corresponding groove to impart the rotary motion of the shaft to the same. In Fig. 2 the clutch is shown in the position it occupies when the pinion is disengaged. In order to couple the pinion to the shaft and to set it in motion, the sliding part 22 of the clutch is to be moved toward the frame, so that its teeth grip into the clutch-teeth of the pinion. In the drawings we have shown a clutch with teeth; but it may be seen that a friction-clutch may be used just as well. The pinion 21 gears with the wheel 25, which is keyed to the intermediate shaft, 24, and the pinion 26, also fastened to the intermediate shaft, works with the wheel 28 of the main shaft 27 and transmits the motion to the same. (Those wheels and pinions which are not visible in Figs. 1 and 6 are indicated by dotted circles representing the pitch-lines of the same.) The main wheel 28 is so constructed as to act also as a crank. 29 being the crank-pin and the circle 30 the trace of the center of this pin, the connecting-rod 31 converts the rotary motion of the main shaft 28 into the reciprocating motion of the carriage 2.

The wrist-pin 32, by means of which the rod 31 is connected with the slide 2, is not directly attached to the slide, but to the block or cross-head 33. (See Figs. 3, 4, and 6.) This block is fitted in a groove provided for the same in the slide 2, and may be moved in and out, parallel to the motion of the carriage 2, by means of the screw 34, which works in a nut tapped in the block, and which is so applied to the slide 2 as to be incapable of longitudinal motion relatively to the slide. The bolt 35 serves to tighten the block 33 to the carriage. The object of this arrangement is to adjust the position of the carriage so that the knife 6 will cut through the paper, but not too deeply into the wooden strip between the two parts of the table. Such an adjustment will be necessary every time after the knife has been ground sharp, as it will become smaller by this operation. This device for regulating the depth of the cut is more convenient and substantial than the older well-known contrivance, in which the knife is adjustable in the direction perpendicular to the paper. Nevertheless, in our machine the wrist-pin 32 could be attached directly to the carriage 2 and the knife arranged adjustably without the machine losing its other new features.

The machine is to be started by the operator, but the stopping is effected automatically by means which we will describe now. The upright shaft 46 is supported and held in position by the foot-step 47 and the journal-box 48, and carries the two arms 45 and 49, which are fastened to the same. The foot-step 47 and the journal-box 48 are secured to the frame. The upper arm, 49, has a form somewhat similar to that of a horseshoe. It surrounds the sliding part 22 of the clutch on the fly-wheel shaft, and is provided with two hubs, one above and one below the bearing 48, which

prevent it from moving longitudinally. In the clutch 22 an annular groove is turned in, and two semi-rings are inserted in this groove and connected by means of pins with the arm 49 in a manner often used for operating clutches. Near the end of the backward-directed lower arm, 45, the cross-head 44, Fig. 5, is applied to the same, so as to be capable of vibrating around its vertical axis. The cross-head has a hole to receive the rod 40, which is turned to a shoulder, and is secured to this rod by means of a nut. The rod 40 passes through holes drilled in the shell of the upright part of the hollow frame and is pivoted to and carried by the arm 37, which vibrates on the pin 38, that is secured to the frame. A spring, which is slipped upon the rod 40, rests against the shell at the left side (when speaking of right and left we refer to Fig. 1) of the vertical part of the frame, in which the hole is only large enough for the rod, passes through the larger hole at the right side of the frame, presses against the cross-head 44, and has the tendency to engage the clutch and to couple the pinion 21 with the rotating fly-wheel shaft. By pulling the rod 40 in the direction so as to compress the spring on the same until the rod occupies the position in which it is drawn in Fig. 1 the clutch may be disengaged and the machine stopped. This operation may be conveniently performed by hand by using the handle in which the arm 37 terminates. To effect the stopping of the carriage automatically, the rod 40 extends toward the left of the pin 39, by means of which it is jointed to the arm 37, and the projecting part of the rod 40 is provided with the pin 41, which projects toward the carriage, and upon which the nose of the trigger-arm 42 acts. The pin 41 is prepared with a flat part fitting in a long hole of the rod 40, and can be moved to and from the pin 39, and can be fastened to the rod at such a position as is required to cause the carriage to stop in its extreme left position. It may be seen that the slot receiving the pin 41, instead of being applied to the connecting-rod 40, may just as well be prepared in an extension of the arm 37. The trigger-arm 42 is pivoted to the carriage 2 by means of the pin 43 and terminates in a handle.

In Fig. 1 the different parts of the machine are drawn in the positions they occupy when the machine is ready to be started, the paper having been placed on the table and compressed, while in Fig. 6 the carriage 2 is shown at half-stroke, the paper half cut through, and the other visible moving parts in corresponding positions.

Before starting the machine the operator has to move the swiveling bar 50 to the position indicated by dotted lines, and in order to set it in motion he has only to lift the arm 42 to release the pin 41, which will set the spring on the rod 40 free to act, to move the upright rock-shaft 46, and to engage the clutch so as to couple the pinion 21 to the rotating fly-wheel shaft. The arms 37 and 42 and the rod 40 will then occupy the positions in which they are shown in Fig. 5. The nose of the arm 42 will rest upon the pin 41; but as the arm 42 moves with the carriage it will leave the pin, drop down, and rest upon the flange of the carriage or upon a pin provided for the purpose, and when the carriage arrives at its extreme right position and the paper is cut through, the arm 42 will be in the position in which it is drawn in dotted lines in Fig. 5. In returning with the carriage the nose of the arm 42 meets the pin 41, pulls the rod 40 toward the left, compresses the spring on the latter, moves the rock-shaft 46 with its arms, disengages the clutch, and so stops the machine.

Having fully described our invention, what we desire to claim and secure by Letters Patent is—

1. In a paper-cutting machine, in combination with a reciprocating carriage, 2, upon which the paper to be cut is placed and clamped, the stationary knife 6, and the arm 1 *h*, Fig. 6, by which the knife is held, the arm 1 *h* being firmly united with the frame of the machine at one side of the paper-carriage and extending freely over the same, so that the space between the knife and the carriage be accessible from one end of the knife and that the paper can be slipped on the carriage in the direction parallel to the knife, substantially as described and specified.

2. In a paper-cutter, the combination of a stationary knife having an oblique position with a carriage or slide which has an oblique table to receive the paper to be cut, and which is moved horizontally against the knife, substantially as described and specified.

3. The frame (Figs. 6 to 10) of a paper-cutting machine having the following three distinct parts, viz: first, a bed, 1 *f*, provided at its upper face with ways for a carriage, 2, upon which the paper to be cut is placed, to slide on; secondly, a vertical column-like part, 1 *g*, arising at one end of the bed, and, thirdly, an arm, 1 *h*, to which the knife is to be fastened projecting from the column-like part, extending over the bed, and having such form and position that when the knife is fastened to it the edge of the knife will be in or near and parallel to the vertical plane passing through the longitudinal center line between the ways on the bed, substantially as drawn, and for the purpose specified.

4. In a paper-cutter with one stationary knife, against which the paper is moved in order to be cut, the gallow-frame 13, having guides for the paper-clamping bar 14 to slide in, being firmly united at its inner end with the paper-carriage 2, extending parallel to the knife, forming a gap, with the carriage, into which the paper can be slipped parallel to the knife, and being provided at its outer end with the swiveling bar 50, substantially as described and specified.

5. In a paper-cutting machine, a stationary knife, 6, and a reciprocating sliding carriage, 2, provided with a paper-clamp, in combination with the described mechanism for moving the carriage with the paper to and from the knife, consisting of the main or operating shaft 27, journaled in the frame of the machine, the crank 28, fastened to one end of the shaft 27, the crank-pin 29, the wrist-pin 32, and the connecting-rod 31, jointed at one end by means of the pin 29 to the crank 28 and at the other end by means of the wrist-pin 32 to the paper-carriage 2, substantially as shown and described.

6. In a paper-cutting machine. the combination, with a stationary knife, 6, a reciprocating carriage, 2, upon which the paper to be cut is placed, and mechanism, substantially as described, for moving the carriage 2 with the paper to and from the knife, of the device for regulating the position of the paper-carriage 2 relatively to the knife 6, comprising the wrist-pin block 33, the adjusting-screw 34, and the bolt 35, the block 33, to which the wrist-pin 32 is attached, being guided in a groove in the carriage 2, and its position relatively to the carriage 2 being adjustable in the direction in which the carriage moves, the screw 34 being journaled in the paper-carriage 2, having parts to prevent it from moving longitudinally in relation to the carriage, and engaging a nut tapped in the block 33, and the bolt 35 serving to secure the block 33 to the carriage 2 when adjusted, substantially as set forth.

7. In a paper-cutting machine, a stationary knife, 6, a reciprocating paper-carriage, 2, and mechanism, substantially as described, for moving the carriage 2 with the paper to and from the knife, in combination with the device for starting and automatically disengaging the motion of the paper-carriage 2, comprising a clutch on the driving-shaft of the machine, the upright rock-shaft 46, the arms 45 and 49 on this rock-shaft, the arm 37, vibrating on a stationary pivot, 38, the rod 40, connecting the arms 45 and 37, the spring on the rod 40, the adjustable pin 41, and the trigger-arm 42, pivoted to the carriage 2, the said parts being arranged and operating substantially as set forth.

HENRY BARTH.
ERNST LIETZE.

Witnesses:
JOSEPH T. HARRISON,
ROBT. C. GEORGE.