

(No Model.)

G. W. ZEIGLER.

MACHINE FOR CUTTING PAPER, CARD BOARD, &c.

No. 504,509.

Patented Sept. 5, 1893.

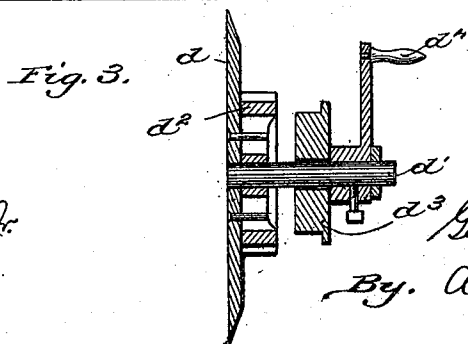
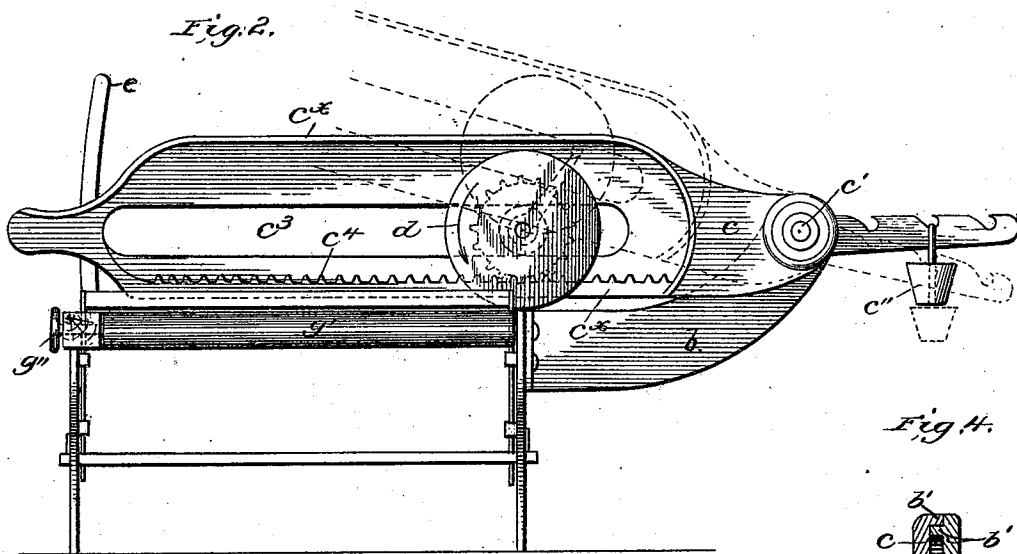
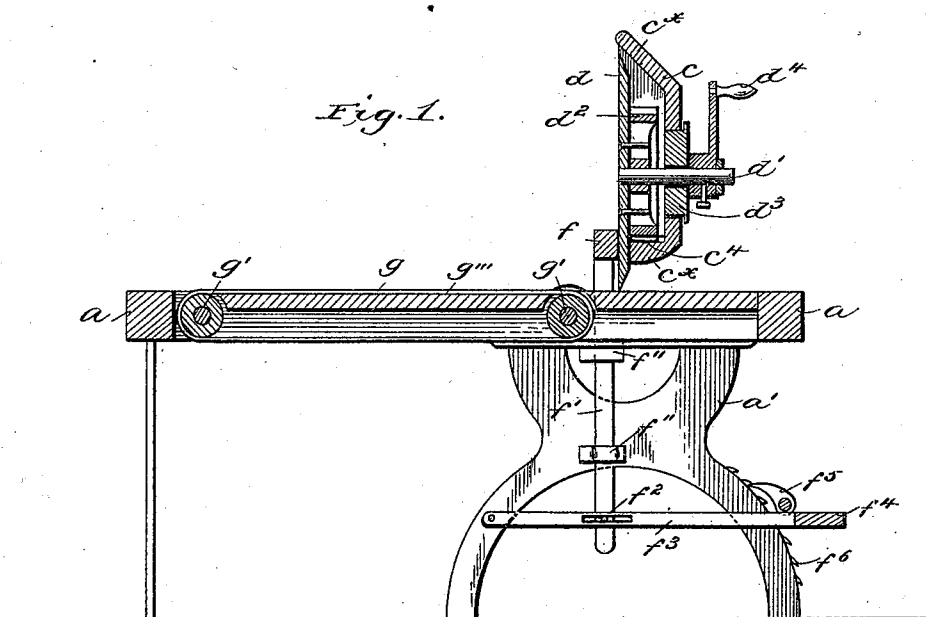
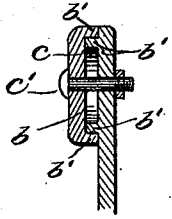


Fig. 4.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR CUTTING PAPER, CARD-BOARD, &c.

SPECIFICATION forming part of Letters Patent No. 504,509, dated September 5, 1893.

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To all whom it may concern:

Be it known that I, GEORGE W. ZEIGLER, a citizen of the United States, residing at Anderson, in the county of Madison and State of Indiana, have invented certain new and useful Improvements in Machines for Cutting Paper, Card-Board, &c.; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section of my improved machine; Fig. 2 a transverse section; Fig. 3 a detail sectional view of the revolving cutter and its parts, and Fig. 4 a detail sectional view of the pivotal connection between the swinging arm and its bracket.

This invention has relation to that class of paper cutting machines wherein is employed a traveling rotary cutter; and it has for its object to improve the mechanism of said machines, rendering it more positive and efficient in operation.

The nature and objects of the invention will more fully appear in the course of this description.

Referring to the drawings by letter, *a* designates the table-frame, which is suitably constructed and is supported by the supports or legs *a'*.

Projecting out from one side of the machine frame is a rigid arm *b* which curves upwardly and has pivoted upon one side of its upper end the metal arm *c*, which extends transversely of the table and carries the rotary cutter *d* and its operating mechanism. The rear end of this arm *c* is extended beyond its pivot *c'* and is provided with a series of notches in any one of which a weight *c''* is hung, which serves to counterbalance the weight of the arm and the parts it carries, thereby enabling it to be readily raised and lowered with ease. This arm is flanged along its longitudinal edge as at *c^x*, its upper flange extending over and projecting the upper edge of the cutter and the lower one bearing closely against the rear side of the cutter, as shown in Fig. 1. The object in pivoting the arm is to enable it to be thrown up, in the manner shown by dotted lines in Fig. 2, into a vertical position, where it will be out of the way, permitting the operator to properly ad-

just the paper before cutting it. This is an important advantage as is evident. In order that the arm will not vibrate upon its pivot and thereby render the cutting inaccurate, the arm and the bracket are provided with circular flanges *b'* on their adjacent faces, as shown in Fig. 4, which fit and turn one within the other and serve to guide it in its pivotal movements. To further guide this arm an upright guide arm *e* is secured at the opposite side of the table, as shown in Fig. 2. The arm *c* is provided with a longitudinal slot *c³* and an integral rack *c⁴* below the slot. Passing through the slot is a short shaft *d'*, which rigidly carries at its forward end the rotary cutter *d*, which bears closely against the lower flange of the arm and projects below its edge a suitable distance, according to the thickness of the cut desired. The bevel of the cutter is formed on its rear face, so that as the paper is cut the bevel on the cutter presses it rearwardly away from the same. Secured rigidly to the shaft and rear face of the cutter is a cog-wheel *d²*, which is smaller than the rack *c⁴* below the slot, and mounted loosely on the shaft in the rear of this gear is a roller-guide *d³* which works in the slot in the arm and serves to guide the cutter and keep it down to its work and also keep the gear in engagement with its rack, as is evident. This roller guide is preferably flanged on its rear face to assist in guiding the cutter and gear. To rotate the cutter and at the same time move it across the table, a crank *d⁴* may be secured to the rear end of the shaft *d'*, as shown, or other suitable mechanism. A presser-bar *f* extends across the table in front of the cutter and is adapted to bear closely against the front side of the same. In connection with the arm this presser bar serves to positively guide the cutter back and forth across the table and support and brace it against vibration while cutting, thereby enabling a thinner cutter than ordinarily to be employed. This bar is secured at its ends to two vertical bars *f* which extend down through the table and have their lower ends connected by pins *f²* to levers *f³*, said vertical bars being vertically guided by loops *f''* on the inside of the frame supports. The forward ends of the levers are pivoted to the frame-sup-

ports and their rear ends are connected by a foot-bar f^4 and carry pawls f^5 , which latter engage racks on the rear edges of the supports. By pressing the foot-bar down the pressure bar f will be brought down firmly on the paper to be cut and serve to securely clamp it in place, the automatic pawls serving to hold it down when depressed. Other suitable mechanism may be employed to depress the pressure-bar, if desired, without departing from the invention in the least.

An endless apron g is mounted in the table-frame on two transverse rollers g' , one of these rollers being journaled near the forward end of the table and the other near to and parallel with the pressure bar. This apron is for the purpose of carrying the paper accurately under the presser-bar the desired distance, a suitable crank or wheel (see g'' Fig. 2) being secured to one of the rollers to enable the apron to be readily moved in either direction. To support the upper part of the apron and prevent it sagging with the weight of the paper a support g''' is rigidly secured to the table frame close up under the upper portion of the apron, this support extending approximately from one roller to the other and entirely across the table-frame.

The plain solid feed table of the machines now in use has always been a draw-back to paper cutting machines, inasmuch as by its use the operator meets with difficulty in adjusting the paper accurately and readily with respect to the cutter. This traveling apron avoids this difficulty, enabling the operator to quickly adjust the package of paper under the cutter without disturbing the relative position of the separate sheets and without shifting its angle with respect to the cutter. This is a very essential feature of this invention. When the paper is properly adjusted by the operator and clamped upon the table, the operator simply lowers the pivoted arm and runs the cutter across the table by its crank or other device. The cutter is guided truly and steadily by the pressure-bar and arm and is prevented from lifting by the roller working in the slot of the arm.

There is a peculiar and important advantage resulting from placing the rack below the slot in the arm and employing a gear-wheel smaller in diameter than the cutter. This arrangement not only causes the cutter to revolve in the direction of its bodily movement across the table but, (as shown by the arrow in Fig. 2) by reason of the lesser diameter of the gear, causes the edge of the cutter to revolve practically faster than the edge or periphery of the gear; that is to say, the gear being rigidly secured to and made smaller than the cutter and held positively in engagement with the rack, will necessarily cause the cutting edge of the cutter to travel a greater distance in a rotary direction than the periphery of the gear during its movement across the table. For example, if the gear be six inches and the cutter twelve inches

in diameter, the cutter edge in consequence of its greater length will have to travel double the speed of the edge of the gear in order to complete its rotations at the same time as the latter, and the greater the disparity between their sizes the greater will be the relative increase of speed. This peculiar motion is advantageous in that the cutter cuts with a rotary shear-cut instead of a straight forcible cut as in all other rotary cutters of which I am aware.

The direct forcible manner of cutting employed by former machines as is well known is very objectionable for the principal reason that it crushes or tears the edges of the paper and presses the torn edges of adjacent sheets into engagement with each other, thereby causing the sheets to stick together after having been cut, necessitating the separation of the sheets by hand, which is a tedious and time-consuming operation. Another objection to the old cutters is that it requires great power to force them through any considerable number of sheets of paper. The foregoing objections and others are overcome by this invention, in which the cutting is done positively and smoothly and without abrasion of the cut edges of the paper, the cut sheets being as unconnected and as easily separable as before the cutting operation.

In practice, it has been found that the edges of cards cut by this machine are sufficiently smoothed and polished by the cutter as to require no subsequent polishing. In practice I have found that making the gear approximately one-half the size of the cutter gives the best results for hand-operated machines, but of course their relative sizes will be varied to suit different classes of work. In cutting quantities of paper thicker than can be cut with one stroke, the operator runs the cutter back and forth the necessary number of times, the cutter cutting in moving both directions across the machine.

It is obvious that this invention is not confined to details of construction.

The weight of the pivoted arm and its parts is sufficient to exert the desired degree of pressure upon the cutter during its cutting operation, the pressure being a resilient or yielding one so that straining of the parts will be avoided and the cutter caused to cut with the same degree of pressure upon all kinds of material. This advantage results from supporting the arm yieldingly over the table, as is evident.

Having thus fully described my invention, what I claim is—

1. In a paper-cutting machine, the combination of a table, a vertically-movable presser-bar extending across the same, an arm pivoted at one side of the table and adapted to swing down across the table parallel with the presser-bar, said arm being resiliently supported over the table and provided with a longitudinal slot and a rack-bar, a shaft extending through the slot and carrying a circular cut-

ter working between the arm and presser-bar, a gear secured rigidly to the shaft and working in said rack-bar, a guide on the shaft working in the slot in the arm, and means for
5 rotating the shaft, substantially as described and for the purpose specified.

2. In a machine for cutting paper &c., a table frame, a vertically movable presser bar mounted over and extending across the same,
10 a cutter-carrying arm extending across the table and carrying a rotary cutter, said arm being vertically yielding, substantially as described.

3. In a paper-cutting machine, a table, a
15 presser-bar extending across the table, a vertically-movable arm extending across the table in front of the presser-bar and provided with a horizontal slot, means for guiding this arm at both its ends, a rack on the arm below
20 the slot, a shaft extending through the slot in the arm and carrying rigidly a rotary cutter, said cutter rotating between the arm and the presser-bar, a gear rigidly carried by the shaft and made smaller in diameter than the cut-
25 ter, a roller guide mounted on the shaft and working in the slot in the arm, substantially as described.

4. In a machine for cutting paper &c., a table, a presser bar, an arm extending across
30 the table in the rear of the presser bar and close to it, a rotary traveling cutter carried

by the arm and working between the same and the rear side of the presser bar, and working closely against the arm substantially as described.

5. In a machine for cutting paper &c., the combination of a table and its supports, a cutter mounted above the table, a presser bar supported on two vertically movable uprights, levers connected to the lower ends of the
40 uprights, a bar connecting these levers, and pawls carried by the levers and adapted to engage racks on the frame, substantially as described.

6. The combination of a table, a bracket-arm thereon, a swinging arm pivoted on this
45 bracket arm and carrying a traveling cutter, the adjacent faces of the two arms being provided with abutting circular flanges b' , substantially as described.

7. The combination of a table, a presser-bar
50 a swinging arm parallel to the presser-bar, and pivoted at one side of the same and carrying a traveling cutter, said arm being resiliently supported above the table and a vertical guiding-arm at the opposite side of the
55 table, substantially as described.

GEORGE W. ZEIGLER.

In presence of—

J. E. WILEY,
M. M. DUNLAP.