(No Model.) 3 Sheets—Sheet 1.

G. W. ZEIGLER.

PAPER CUTTING MACHINE.

No. 504,510. Patented Sept. 5, 1893.

Fig. 7.

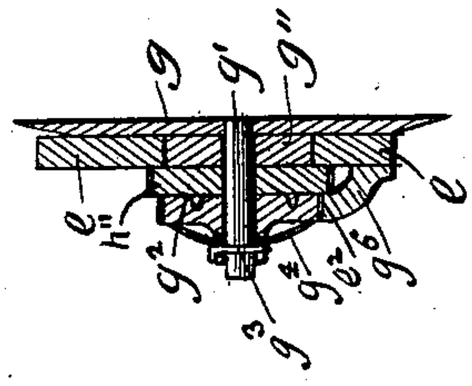


Fig. 8.

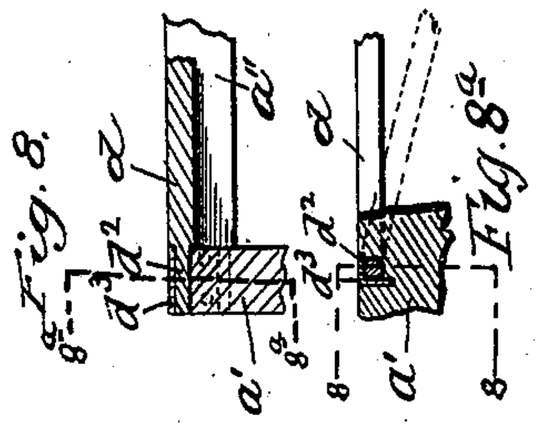


Fig. 9.

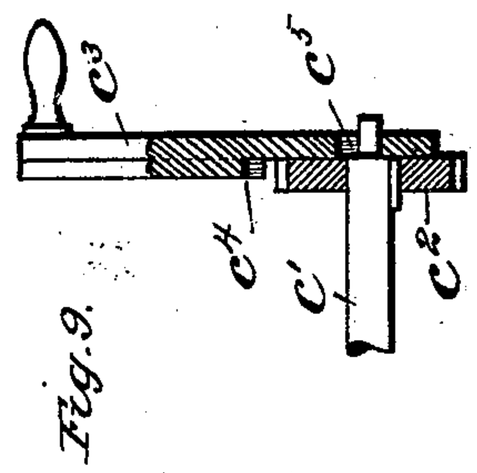
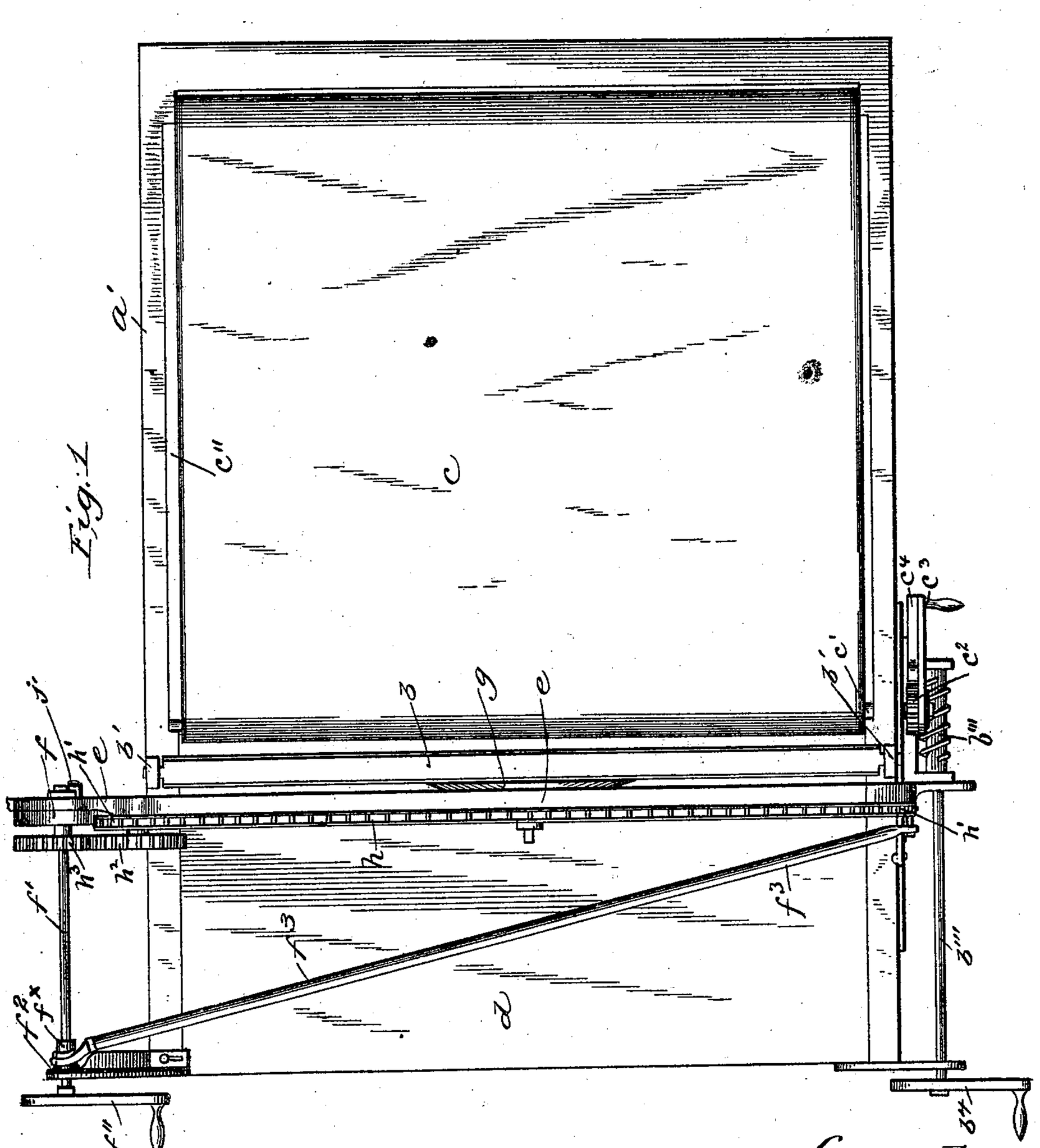


Fig. 1



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PAPER CUTTING MACHINE.

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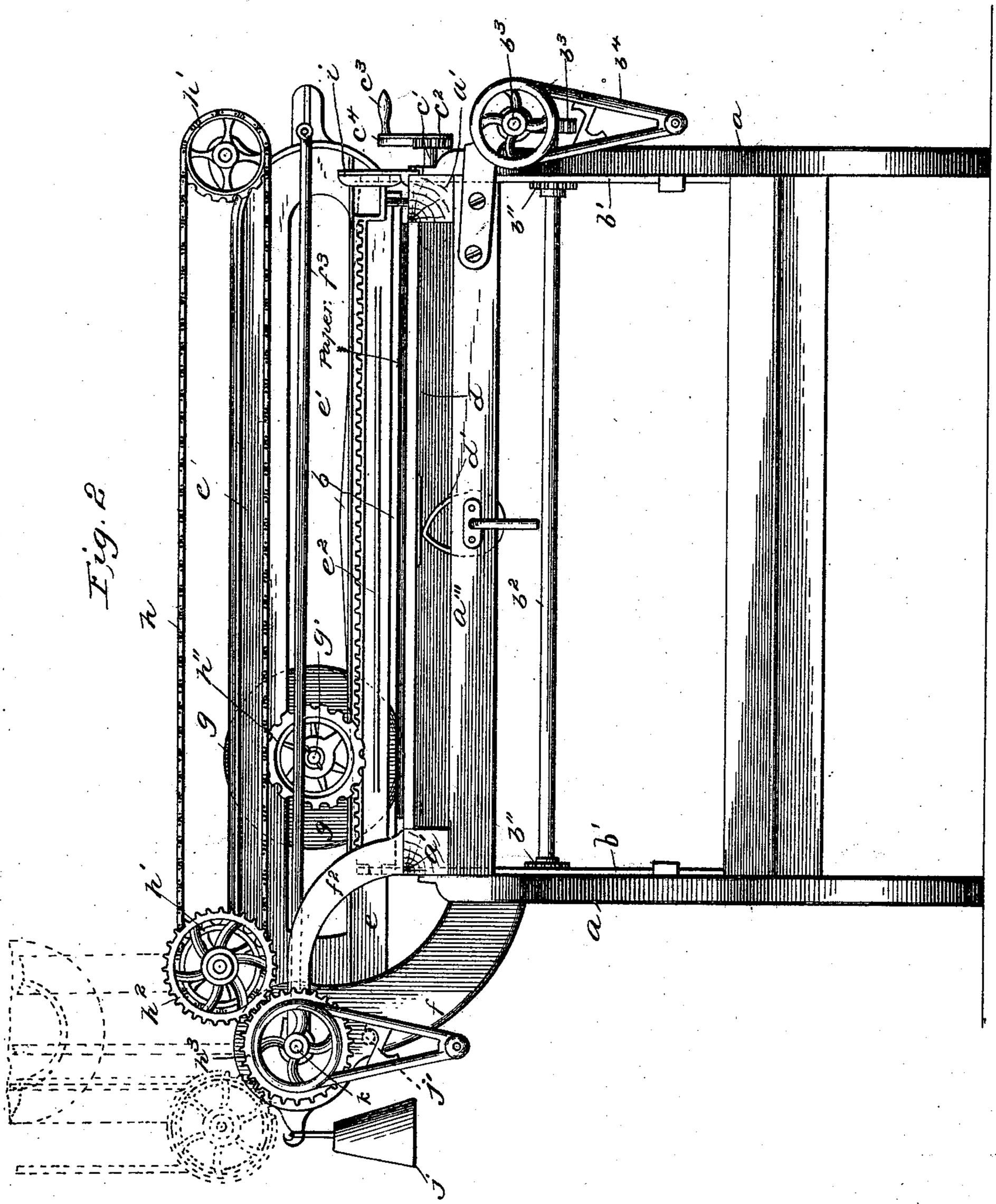
Fig. 2



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(No Model.) 3 Sheets—Sheet 3.

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PAPER CUTTING MACHINE.

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Fig. 6.

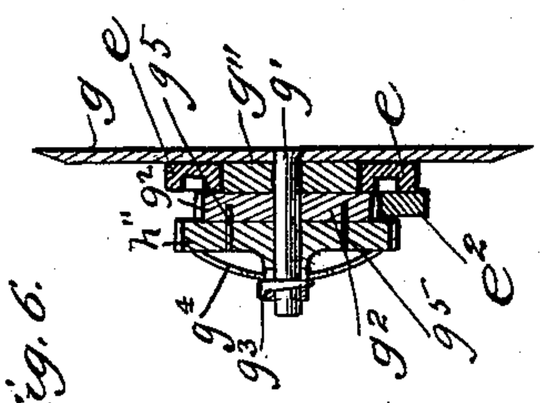


Fig. 5.

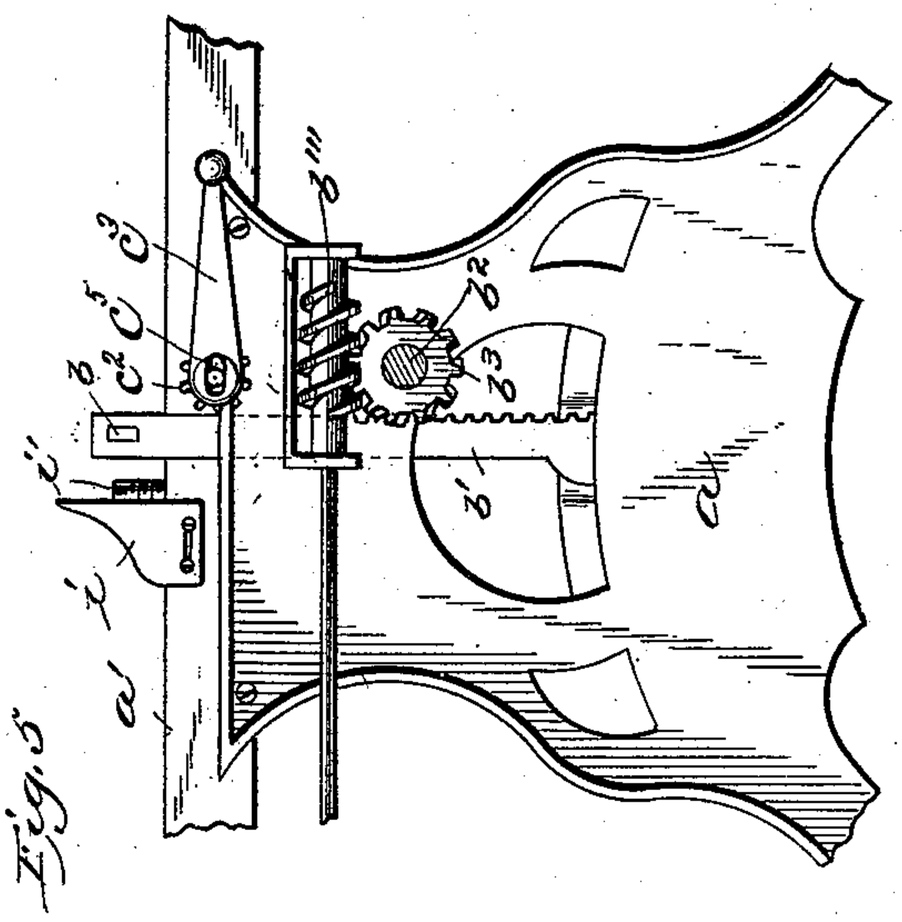


Fig. 4.

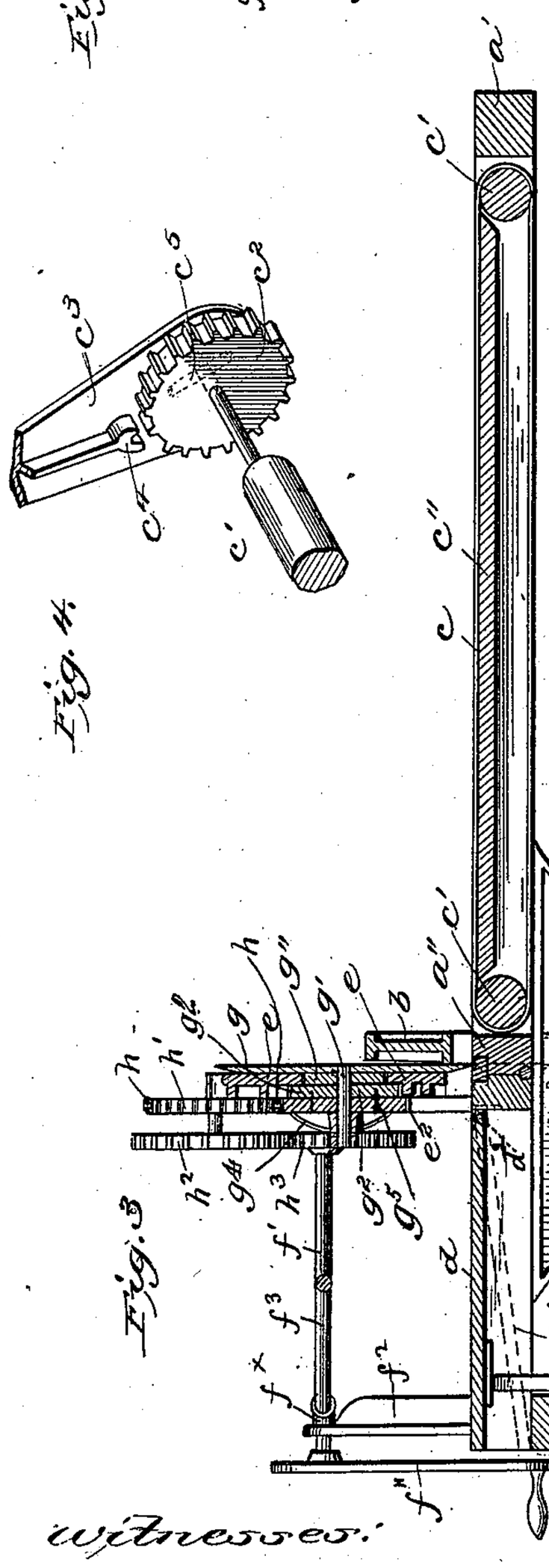
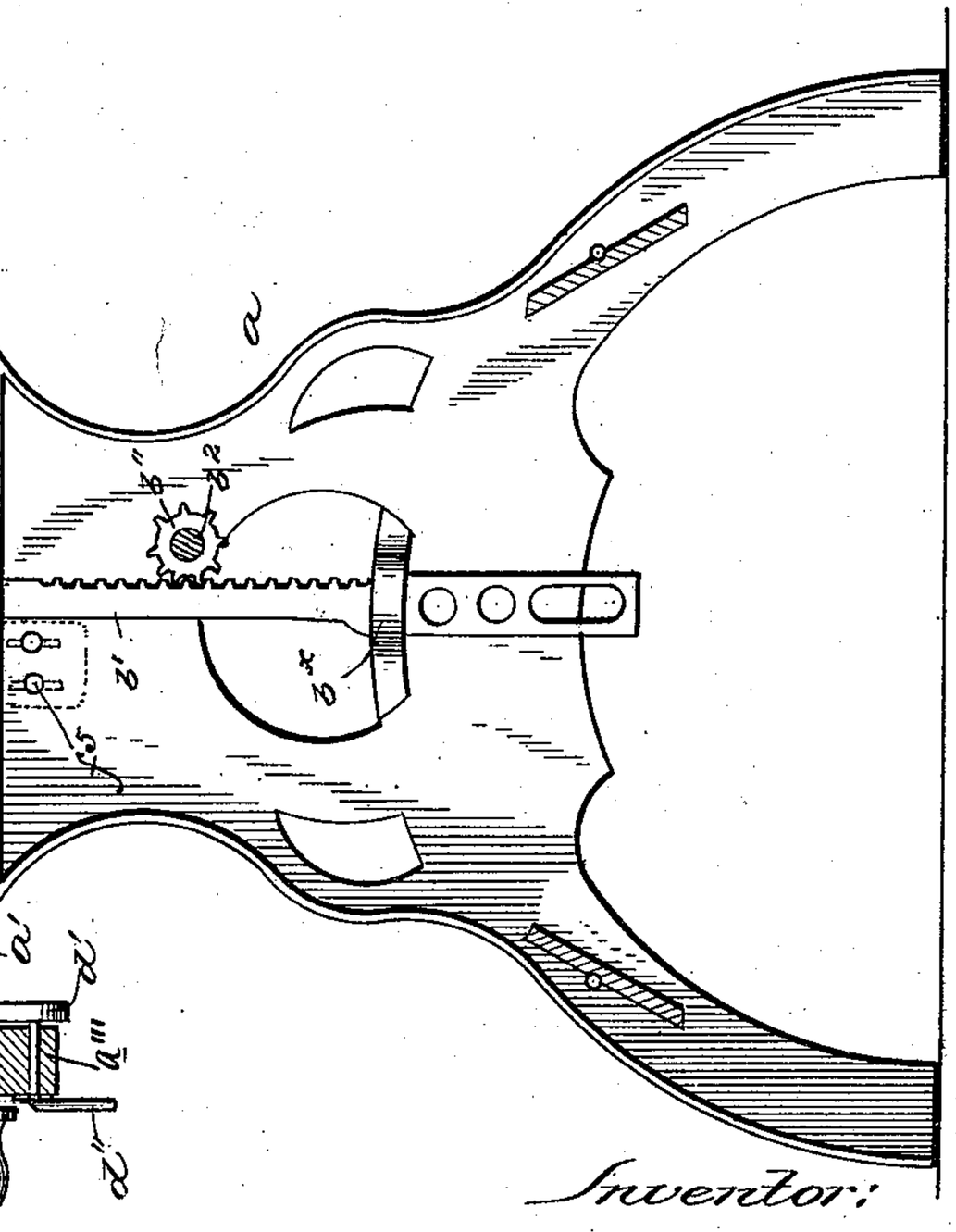


Fig. 3.



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UNITED STATES PATENT OFFICE.

GEORGE W. ZEIGLER, OF ANDERSON, INDIANA.

PAPER-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 504,510, dated September 5, 1893.

Application filed October 20, 1892. Serial No. 449,459. (No model.)

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, &c., of which the following is a specification, reference being had therein to the accompanying drawings, in which—

Figure 1 is a plan view of the complete machine; Fig. 2 a rear end view showing the machine in the act of cutting a package of paper; Fig. 3 a longitudinal vertical sectional view; Fig. 4 a detail perspective view of the device for operating the apron; Fig. 5 a side elevation of a portion of the machine; Fig. 6 a detail sectional view of the cutter and operating devices on its shaft; Fig. 7 a similar view showing a slight modification, and Fig. 8 detail sections on line 8—8 of Fig. 8ª showing the pivotal connection of the hinged supporting plate. Fig. 8ª is a detail view on line 8ª 8ª of Fig. 8, and Fig. 9 a detail sectional view of the device for operating the apron.

This invention relates to improvements upon that class of paper cutting machines covered by my application for patent, Serial No. 426,027, filed March 22, 1892, wherein are employed a vertically swinging arm carrying a traveling rotary cutter and an endless apron to carry the material rearward under the presser bar; and its nature and objects will fully appear in the course of this description.

Referring to the drawings by letter, *a* designates the supports of the machine, *a'* the table-frame mounted thereon, *b* the transverse presser-bar extending across the machine near its rear end and supported on the upper ends of two vertical bars *b'* which pass down through openings in the table and are vertically guided by loops $b^{\times}$ on the supports *a*. These bars *b'* have racks formed on their edges with which engage pinions *b''* secured on a transverse shaft b^2 journaled in the frame below the table. On one end of this shaft b^2 is secured a worm-gear and meshing with this gear is a worm *b'''* journaled in bearings on the outer side of one of the supports *a* and having its shaft extended to the rear end of the machine and provided with an operating crank b^4. By means of these devices the presser bar may be drawn down powerfully and evenly upon the paper, firmly clamping the paper to the table while being cut, the worm and gear serving to positively lock the presser bar in its adjusted positions.

Mounted upon transverse rollers *c' c'* journaled in the table-frame, is the endless feed-apron *c* which carries the material under the presser-bar, its upper portion being supported against sagging by the board or plate *c''*, as covered in my former application hereinbefore referred to. On one end of the rear roller *c'* is secured a toothed wheel c^2, and alongside this toothed wheel is loosely secured a lever c^3 provided with a stationary pawl or lug c^4 adapted to engage the toothed wheel. The reduced end of roller *c'* passes through a vertical slot in the lower end of the lever and thereby permits the same a limited independent radial movement on the shaft. This arrangement is desirable in order that the crank may be turned down out of the way and will not have to be turned entirely around in operating the apron-roller, the adjacent parts of the machine preventing the entire rotation of the crank when set close to the machine. Without this or a similar device the apron shaft would have to be somewhat extended beyond the adjacent parts of the operating devices, which would sacrifice compactness. This arrangement also facilitates the accurate adjustment of the paper carried by the apron.

Extending across under the presser bar is the bar or beam *a''* of the table frame and close behind the upper corner of this beam is hinged a board or plate *d* which forms a section of the table and extends approximately the full width of the same. The hinge of this board consists of lateral pivots d^2 projecting from the side edges of the board and setting in recesses in the side beams *a'* and held in place by metal plates d^3, as shown in Fig. 8. The rear of this board is supported horizontally by means of a cam *d'* which is secured to and operated by a handle or crank *d''* journaled in a transverse frame-beam *a'''* below the board. By rotating the cam a half-turn the rear edge of this board may be dropped a short distance until it rests on said beam *a'''* thereby inclining the board downwardly and rearwardly from the cutter, as shown in dotted lines in Fig. 3. After the paper is

clamped securely by the presser-bar and before it is cut, this section is lowered by the cam. Then when the paper is cut it automatically moves away from the knife down the inclined section, thereby not only freeing the cutter but also disconnecting the sheets should they be slightly stuck together by the cutting operation. In cutting thick stacks of paper it is necessary to run the cutter across the machine several times; this inclined section is particularly advantageous in such cases as the paper will automatically move away from the cutter after each passage of the same as is evident, the cutter cutting in traveling in both directions.

The swinging-arm *e* which carries the rotary cutter *g*, extends transversely of the machine near the presser bar and is pivoted on a bracket *f* secured to one of the supports *a*, this bracket being preferably secured by suitable adjustable devices (such, for instance, as the vertical slots and bolts f^5 shown in Fig. 3) in order that the cutter arm may be vertically adjusted. The opposite end of this arm *e* is guided and held in place by means of a vertical plate *i*, which, as shown most clearly in Fig. 5, is secured adjustably to the table in the rear of the arm. This plate *i* together with the presser-bar serves to hold the arm against lateral vibration during the cutting operation. To support the outer end of this arm *e* and accurately adjust it, a vertically-adjustable screw *i'* is screwed into the top of the table near the guide-plate *i*, as shown in Figs. 2 and 5. The arm *e* is provided with a long horizontal slot *e'* and below this slot and parallel with it, on the rear side of the arm, is formed a horizontal rack e^2. The pivotal bolt that secures the arm to its bracket is extended rearwardly and formed into a shaft *f'*, whose rear end is provided with an operating crank *f''* and is journaled in another bracket f^2 suitably mounted on the adjacent edge of the table. Connecting the sleeve $f^\times$ formed on the end of the bracket f^2 to the free end of the arm *e* is a rigid rod f^3, which serves to brace the arm and assist in preventing lateral vibration in its pivotal movements.

The rotary cutter *g* is mounted between the arm *e* and the presser bar, rigidly on a short shaft *g'* extending rearwardly through the slot *e'*, and loosely mounted on this shaft close behind the cutter is a loose roller-guide *g''* which serves to guide the cutter and keep it down to its work, as more fully described in my other application hereinbefore referred to. A gear-wheel g^2 is slidably secured on the shaft *g'* in the rear of the arm and this gear meshes with rack *e* on the arm.

Slidably secured on the shaft *g'*, in the rear of gear g^2, is a sprocket-wheel *h''*, which carries pins g^5, which engage recesses in the adjacent face of the gear and cause the two wheels to revolve in unison. The rearwardly-extending hub of the sprocket-wheel is slotted longitudinally and working in these slots are the ends of a pin g^3 rigidly secured in the shaft *g'*. In this manner the wheels are permitted a limited sliding movement on the shaft but are compelled to rotate with it.

To normally draw the cutter, with the desired degree of pressure, against the front side of the arm and hold the gear and sprocket in proper position, a bowed spring is secured between the projecting ends of the pin g^3 and the adjacent sprocket wheel, as shown most clearly in Fig. 6. Thus yieldingly drawing the cutter against the arm is advantageous in that the desired degree of pressure against the arm is at all times maintained and undue friction thereby avoided.

To rotate the cutter and carry it back and forth across the table, an endless sprocket chain *h* is employed, said chain being mounted upon two vertical sprocket-wheels *h'* journaled upon the rear side of the arm at its opposite ends. The lower part of this chain is held constantly in engagement with the sprocket-wheel *h''* on the rear end of the short shaft *g'*, so that as the chain is drawn back and forth the cutter shaft is rotated and carried back and forth across the table, the gear on this shaft serving to positively rotate the cutter in a forward direction and impart to its cutting edge the desired accelerated motion to obtain a shear-cut, as fully described in my former application. The chain is preferably driven by means of a pair of intermeshing gears h^2 h^3, the former of which is secured on the shaft of one of the wheels *h'* and the latter on the shaft *f'*, whereby by simply operating the crank *f''* in one direction the cutter may be drawn across the machine and by turning it in the opposite direction it may be brought back again. A weight *j* may be hung on a suitable hook or lug on the arm *e* beyond its pivotal point, in order to counterbalance the weight of the arm and its parts, as is evident. The weight hook abuts against a stop *j'* on the bracket when the arm is raised and thereby prevents the arm moving over too far.

Before the paper is adjusted on the table, the swinging arm is swung up to a vertical position out of the way, as shown by dotted lines in Fig. 2. When the paper is properly clamped the arm is let down and the cutter caused to travel across the table by simply revolving the shaft *f* by means of its crank, the arm and presser bar serving to guide and brace the cutter in its movement. By securing the driving gear h^3 on a shaft concentric with the pivot of the arm it will be observed that the gear h^3 and h^2 are kept constantly in engagement irrespective of the position of the swinging arm. Should the package of paper be narrower than the apron, the cutter need not be caused to travel entirely across the table, as is evident, but may be simply run back and forth over the narrow package by simply oscillating the operating crank *f''*. In cutting thick packages of paper the arm *e* rests directly upon

the same and as the paper is cut and moves away the arm settles down automatically until it rests on its screw stop i', as is obvious.

As shown in Fig. 7, the sprocket wheel h'' may be secured on the shaft between the gear g^2 and the arm e, in order to apply the propelling power to the cutter-shaft as nearly midway between the cutter and the gear as possible, and thereby prevent straining and binding; this is especially desirable in large power machines. The rack e^2 in this instance will be supported and secured to the arm by suitable brackets g^6, as shown.

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

1. The combination, in a paper-cutting or analogous machine, of a table, a transverse presser-bar and means for operating it, a cutter operating near the presser-bar, a table section d hinged at its forward edge to the table-frame, directly in the rear of the path of the cutter, and extending approximately the full width of the table, means for supporting the section d flush with the table and for lowering its rear edge, and a support for the rear edge of section d, located a short distance below the upper surface of the table, so as to maintain said section in a rearwardly-inclined position when lowered, as and for the purpose described.

2. The combination of a table and a cutter and a presser bar, apron-rollers journaled in the table-frame an apron on the rollers, a toothed wheel on one of the rollers, a radially movable lever or crank on this roller and provided with a stationary lug engaging the toothed wheel, substantially as described.

3. The combination of a table, a swinging arm pivoted thereon and carrying a cutter, its pivotal bolt being extended rearwardly, a bracket f^2 on the table for supporting the rear end of said shaft, said bracket being provided with a short sleeve $f^\times$, and a rigid brace-rod f^3 extending from the sleeve $f^\times$ to the free end of the arm, substantially as described.

4. The combination of a table, a transverse arm, a shaft carrying a traveling cutter, said shaft also carrying a sprocket wheel, a chain carried by the arm and engaging said sprocket wheel, and means for operating the chain, substantially as described.

5. The combination of a table, a transverse arm pivoted at one side of the table, a traveling shaft g' carried by the arm, a rotary cutter and a sprocket on this shaft, a sprocket-wheel h' journaled at each end of the arm, an endless chain carried by the sprockets, a shaft f' journaled concentrically with the pivotal point of the arm, and gears h^2 h^3 substantially as described.

6. The combination of a table, a transverse presser bar, a transverse vertically-swinging slotted arm pivoted on a bracket at one side of the machine and provided with a rack e^2 a shaft f', a shaft g' passing through the slot in the arm and rigidly carrying a rotary cutter working between the arm and the presser bar, a guide roller mounted on this shaft g' and working in the slot in the arm, a sprocket-wheel on shaft g' and working in rack e^2, an endless chain mounted on sprocket wheels on the arm and engaging the sprocket on shaft g', and gears h^2 h^3 for operating the chain-carrying sprockets, substantially as described.

7. The combination of a table, an arm extending across the same a rotary traveling cutter carried by the arm means for rotating the cutter, and means for holding it yieldingly against the face of the arm, substantially as described.

8. The combination of a table, an arm extending across the same and provided with a rack a traveling shaft g' carried by the arm, a cutter on the shaft and bearing against one face of the arm, a gear on the shaft and held in engagement with the rack, and a spring for yieldingly holding the cutter against the arm and the gear in engagement, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE W. ZEIGLER.

Witnesses:
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CHARLES MUZZY.