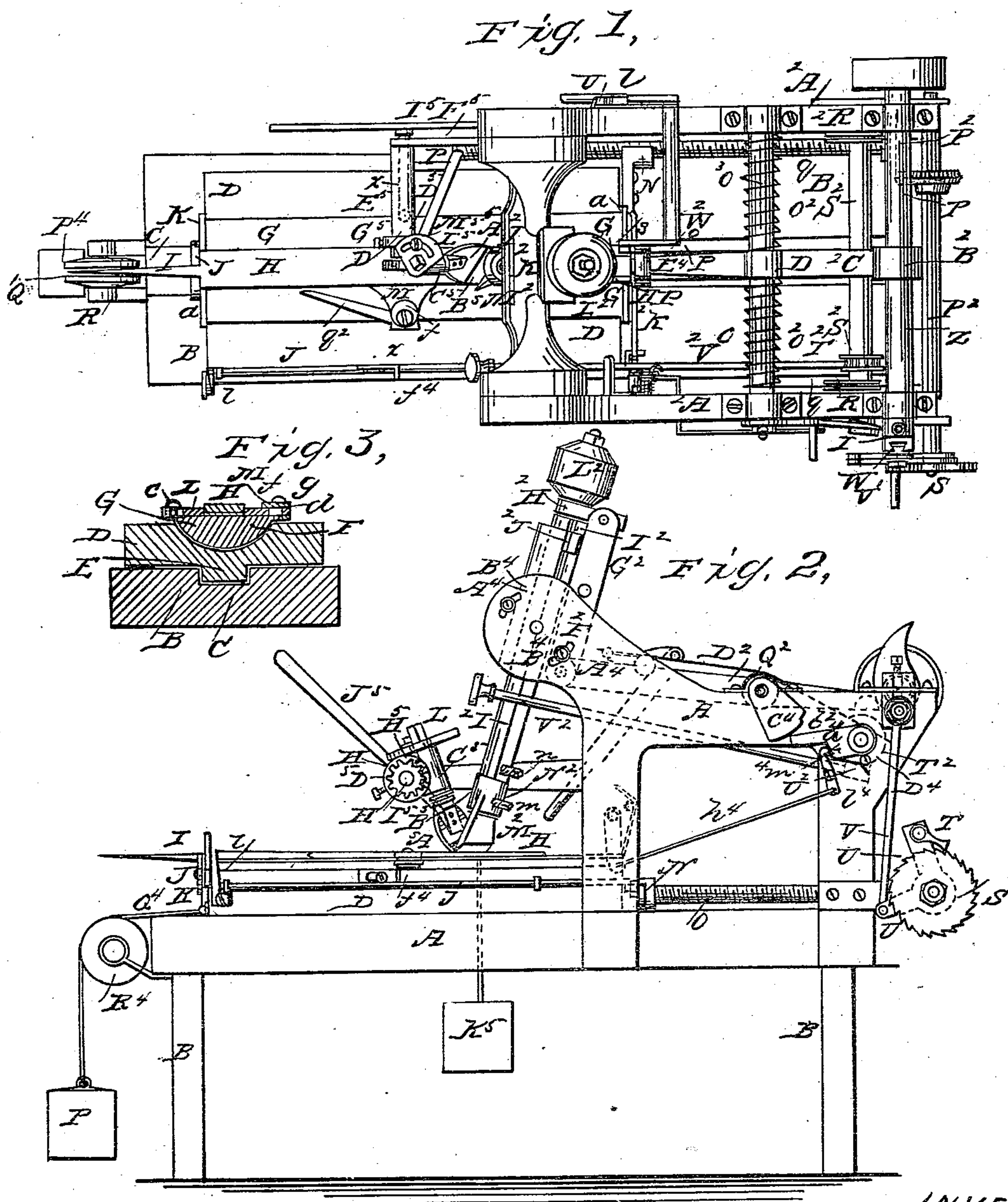


C. VOGEL.  
Cutting Files.

No. 61,486.

Patented Jan. 22, 1867.



WITNESSES:

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# United States Patent Office.

CHARLES VOGEL, OF NEW YORK, N. Y.

*Letters Patent No. 61,486, dated January 22, 1867.*

## IMPROVED MACHINE FOR CUTTING FILES.

*The Schedule referred to in these Letters Patent and making part of the same.*

### TO ALL WHOM IT MAY CONCERN:

Be it known that I, CHARLES VOGEL, of the city, county, and State of New York, have invented new and useful improvements in "Machines for Cutting Files;" and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing, forming part of this specification.

This invention relates to a new and improved machine for cutting files, and it consists—

First, in an improved arrangement of mechanism for feeding the file-blank to the cutter, whereby the speed of the file may be varied according to the size of tooth required.

Second, in an improved file-bed so constructed that files of varying sizes can be secured thereon.

Third, in a novel manner of hanging the cutting tool, whereby it can be adjusted to suit the desired direction or angle of inclination of tooth with reference to the length of the file-blank.

Fourth, in so hanging or arranging the cutter that the force with which it strikes the file-blank can be readily adjusted to the depth of cut required or desired.

Fifth, of a pressure-foot, arranged in such a manner as to bear upon the file-blank just in front of the cutter as it strikes the same, and thus hold the file-blank firmly down and upon its bed; this pressure-foot being susceptible of adjustment at pleasure, according to the amount of pressure required, and also to adapt it to the work which it is required to perform, as will be hereinafter described.

In accompanying plate of drawings, my improvements in file-cutting machines are illustrated—

Figure 1 being a plan or top view of the same.

Figure 2, an elevation of one side of the same; and

Figure 3, a section in detail, taken in the plane of the line *x x*, fig. 1.

Similar letters of reference indicate like parts.

A, in the drawings, represents the bed-piece of the machine, supported in a horizontal position, or nearly so, upon legs B B at each end. This bed is grooved at C along its entire length from one end to the other, in which groove is arranged a slide or carriage, D, that by its tongue E fits or slides therein. The upper side of the carriage D, in the direction of and for its entire length, is provided with a semicircular-shaped groove, E<sup>2</sup>, in transverse section, in which groove fits the circular or arc-shaped side F of a block, G, having the form of a segment in transverse section. This block corresponds in length to that of the carriage, and at each end is pivoted with a projecting flange or lip, *a*, around its arc or circular portion, which lips prevent the said block from moving laterally upon the carriage. On the upper side of the rolling block G the file-blank H, which is to be cut, is laid, with its tang I interlocked with the proper notch of the series of notches J, made in the circular plate or disk K hung upon one end of the block; the blank being confined on its sides or edges between a side rest, L, on the upper side of the block, susceptible of adjustment by means of its slot *b* and set-screw *c*, and a swinging jaw, M, hung upon a sleeve, *e*, or bushing, *d*, upon the under side of an eccentric, *f*, hung upon a pin, *g*, of the upper side of the block G, which eccentric has a lever or handle, *g*<sup>2</sup>, for operating it, and thus bring the jaw to bear against the edge of the blank, binding it between the said jaw and the rest L upon the opposite side, or to release it therefrom, and thus leave the blank free to be removed from the block, when so desired, to replace it with a new one, or for any other reason. On one end of the block G is secured, by means of a slot and set-screw, a half-screw nut, N, that projects beyond the side of the block, and is susceptible of being adjusted, so as to project more or less from the side of the block, by properly turning the lever rod *j* hung in guides or bearings *k* along the opposite side of the block, and at its end having the screw-nut connected with the extension-arm K of such nut, as plainly shown in fig. 1 of the drawings. *l*, a pawl or catch, hung to the side of the block G in proper position for being interlocked with the lever-rod *j*, and holding it in whatever position it may be brought or adjusted. The object of the above arrangement of the half-screw nut upon the block is to throw it into or out of connection with the horizontal screw-threaded shaft O extending along one side of the bed-piece A, turning in suitable bearings P of the same, by means of which shaft, when revolved with the half nut in connection with it, the feeding of the block G carrying the file-blank is accomplished, for a purpose to be hereinafter stated. To one end of the screw-shaft O a bevel gear-wheel, P<sup>2</sup>, is secured, which interlocks with a bevel gear-wheel Q secured to a transverse horizontal shaft, R, hung and turning in bearings



of one end of the bed-piece A. To one end of this shaft R is secured a ratchet-wheel, S, with which engages a pawl, T, hung upon an angular rocker or bell-crank arm, U, turning or swinging upon the shaft R in proper position therefor. To this bell-crank arm U a pitman rod, V, is hung at one end, and at its other end hung upon a slide-box, W, arranged in a dove-tail groove, X, of the crank-arm Y, secured to one end of a horizontal transverse shaft, Z, turning in bearings of the parallel upright frames  $A^2$  extending along the sides of the bed-piece A; the connection between the pitman rod V and the box W being such that the said box can be secured at any desired distance from the centre of the shaft Z, within the limits of its crank-arm Y, in which it is arranged to slide, whereby the length of stroke of the pawl T is changed, consequently causing the shaft R, at each stroke of the pawl, to revolve a greater or lesser distance, as the case may be, and thus, through the connection of such shaft with the carriage carrying the file-blank block, feeding the same along upon the bed-piece at a greater or lesser degree of speed for a purpose to be hereinafter stated. On the shaft Z, half way between the two side upright frames  $A^2$ , is secured a tappet,  $B^2$ , which, as the said shaft revolves, abuts against the end  $C^2$  of a beam or boom,  $D^2$ , so hung across from one to the other of the side frames  $A^2$  as to rock or swing in a vertical plane. The other end,  $E^2$ , of the boom  $D^2$  is hung to and between the lower ends  $F^2$  of two parallel vertical bars  $G^2$ , that at their upper ends are hung to the lug  $H^2$  projecting to the rear of a stock,  $I^2$ , square-shaped in cross-section, arranged to move in a vertical plane through the guides or clasps  $J^2$  secured to the rear side of a horizontal shaft,  $K^2$ , extending across the machine from one side frame  $A^2$  to the other, and arranged in a suitable manner, as will be presently explained, to allow the vertical direction of the said clasps or guides  $J^2$  to be more or less inclined, for a purpose to be hereinafter stated. The upper end of the stock  $I^2$  is weighted by a block,  $L^2$ , which is secured thereon to be susceptible of detachment at pleasure, and a heavier or lighter block or weight applied; and in the lower end of the stock  $I^2$  is held the cutter or tool  $M^2$  for cutting the file-teeth, which cutter has the cutting edge down, and is secured by a set-screw,  $m$ , in a holder,  $N^2$ , which fits in a suitable-shaped socket in the end of the stock  $I^2$ , and is there secured by a set-screw,  $n$ , the object of this arrangement being to enable the direction of the cutting edge of the tool to be changed or adjusted at any desired angle with reference to the length of the file-blank. Upon each side of the boom  $D^2$ , between its fulcrum point and the end by which it is hung to the tool-stock as explained, a grooved pulley,  $o$ , is fixed, on which rest the loose ends  $p$  of spiral springs  $O^2$  coiled around the fulcrum shaft  $O^3$  of the beam  $D^2$  with the other loose ends  $q$  of said springs, each resting upon the grooved periphery of eccentric or cam-pulleys  $R^2$  secured, one at each end, to the transverse horizontal shaft  $S^2$ , arranged to turn in bearings of the side frames  $A^2$ . On this shaft  $S^2$  is a toothed wheel,  $T^2$ , with which is engaged a worm-gear,  $U^2$  at one end of a horizontally inclined spindle or shaft,  $U^2$ , hung in suitable bearings of one of the side frames  $A^2$ , and extending along the same to its end, having the tool stock arranged in it, at which it is provided with a milled head for convenience in turning it. To raise the ends of the springs resting upon the beam pulleys  $o$ , a lifting-arm  $W^2$  is hung upon one of the side frames  $A^2$  in proper position for its pulley  $s$  to come under one of the springs, and thus by turning it in the proper direction lift the spring from its bearing upon the beam, in which position it is held by interlocking the handle  $t$  of said lifting-arm with the notch U upon the outside of one of the side frames  $A^2$ . To enable the shaft  $K^2$ , having guides  $J^2$  for the stool stock  $I^2$ , to be adjusted to give a more or less inclined vertical direction to the movement of the said stock, it is hung at each end in or to the side frames  $A^2$ , so as to be turned or revolved, thus, as is obvious, producing the desired inclination of the tool stock; when, tightening the set-screws  $A^4$  inserted in the ends of the shaft  $K^2$  passing through circular slots  $B^4$  (concentric with the centre of the shaft) of the side frame  $A^2$ , the said shaft can be there secured.

In the operation of the machine, the following adjustments are made after it, the file-blank to be cut, has been laid upon the rolling-block G, and there secured in the manner hereinbefore explained, viz: first, the edge of the cutter-tool is adjusted to the desired direction or angle with reference to the length of the file-blank, by turning its holder in the tool-stock, in the proper direction therefor, and there securing it by the set-screw  $n$ ; second, the vertical inclination of the movement of the tool-stock is adjusted, as hereinbefore explained; third, the force with which the cutter-tool is to be impelled against the file-blank is regulated to the depth of cut required by using the proper weighed block in the place of the block marked  $L^2$  in the drawing, in connection with the force imparted to the cutter-tool by the action of the coiled springs  $O^2$   $O^2$ ; and fourth, the travel of the slide carrying the file-block is adjusted to the feed necessary to produce the desired width or space between the several cuts or teeth made in the file-blank by the cutter-tool, by properly setting the block W in the crank-arm Y therefor; all of which having been completed, the shaft Z is then turned in the direction indicated by the arrow in the drawings, thus through the various parts or devices intervened between such shaft and the cutter-tool stock and file-carrying slide, alternately raising the said tool-stock and allowing it to drop, and also imparting an intermittent forward movement to the said file-carrying slide toward the plane of action of the cutter-tool, until the whole file-blank, having been thus subjected to the action of the cutter-tool, the cutter-tool is then held suspended above the file-blank, as will be presently explained; when, disengaging the half-nut N from the screw-shaft O, the file-carriage is free to be drawn back to its original position by the weight  $P^4$  connected therewith, through the cord  $Q^4$  passing over a pulley,  $R^4$ , at one end of the bed-piece A, from which carriage the file-blank is then removed, and either replaced with its other side or face upward, or a new one inserted, as the case may be, when, reconnecting the half-nut N with the screw-shaft O and relieving the tool-stock, the same operations again occur, as before explained, and so on as long as may be desired. To hold the tool-stock suspended, while the file-blank is being removed from the machine, as above stated, or for any other reason, I have provided a spring-stop or catch,  $a^4$ , which, being allowed to interlock with the notch  $b^4$  of the arm  $c^4$  secured to the beam-shaft carrying the cutter-tool, acts as a stop or limit to the downward movement of the tool-stock at such a point of the same as to prevent the tool from coming in contact with the file-blank, while at the same time not necessitating the stopping of the machine or the disconnecting it from the



driving power used. In order to automatically throw the stop  $a^4$  into connection with the notch  $b^4$  of the arm  $c^4$  attached to the tool-beam shaft, through the forward movement of the file-carriage, upon the bed-piece A, and at the moment when the entire length of the file-blank has been acted upon by the cutter-tool, or at any desired point of the same, I have attached to one side of the carriage an arm,  $f^4$ , susceptible of adjustment thereon in the direction of its length by means of a slot and set-screw, which arm  $f^4$  by abutting against and swinging a lever-arm,  $g^4$ , hung to one of the side frames  $A^2$  in proper position therefor, through such arm  $g^4$ , and the rod  $h^4$  connecting it with a spring-hook or catch,  $l^4$ , engaged with the notch  $m^4$  of the said stop  $a^4$ , releases such catch  $l^4$  therefrom, and thus leaves the stop free to be swung, by the action of its spring  $n^4$ , into position to interlock with the notch  $b^4$  of the beam-shaft arm  $c^4$ , hereinabove referred to, as is obvious without any further explanation; the said stop  $a^4$ , when set free or disengaged from the said notched arm  $c^4$ , being so held by the catch  $l^4$ . As the file-blank is made thinner at one end than at the other, it is of course necessary to regulate the force of the blow of the cutter-tool upon the file-blank according thereto, which result in my machine can be accomplished by either lifting one or both of the springs  $o^2$  from bearing upon the beam carrying the cutter-tool, through the means hereinbefore explained, as provided therefor, and thus consequently decreasing the force of its blow to an extent equal to the force exerted by such spring, or by decreasing the tension of such springs, and thus the amount of force which they exert upon the beam carrying the tool, by turning the shaft  $S^2$  having the eccentrics or cams  $R^2$  in the proper directions therefor, or by both means, the said shafts  $S^2$  having the eccentric or cams  $R^2$  enabling the tension of the springs to be increased, if so desired, by simply turning the said shaft in the proper direction therefor. It is intended to make the tappet of the shaft, by which the cutter-tool is raised or lifted from the file-blank, of such a shape, that, just previous to the action of the feeding devices for the file-carriage, it will commence to raise the cutter-tool from the file-blank, and thus prevent injury to the one or the other. In order to hold the file-blank firmly down upon the block G, to which it is secured, and close to the point of action of the cutter-tool, upon the same, I have arranged a pressure-foot,  $A^5$ , to bear upon the upper side of the file-blank, as will be now explained. This foot,  $A^5$ , is hung to the lower end of a short, screw-threaded rod or shaft,  $B^5$ , passing loosely through a hollow sleeve or tube  $C^5$ , secured by a set-screw,  $G^5$ , to a collar or ring,  $D^5$ , arranged upon an arm  $E^5$ , attached by a connecting-arm,  $F^5$ , to one of the side frames  $A^2$ .  $H^5$  a pinion-wheel attached to one end of a spindle,  $I^5$ , passing loosely through the arm  $E^5$ , and provided with a lever-handle,  $J^5$ , at the other or outer end, having a weight,  $K^5$ , suspended from it. This pinion-wheel,  $H^5$ , engages with the screw-shaft  $B^5$ , to allow which the sleeve or tube  $C^5$ , through which such shaft extends, is cut away upon one side. The upper end of the screw-shaft  $B^5$  projects above the tube  $C^5$ , and at such end is made square, with a plate,  $L^5$ , fitted over the same, that by means of a set-screw,  $M^5$ , passing through a circular slot,  $N^5$ , in the plate, concentric with the centre of the said shaft, is secured to the holder or collar  $D^5$ , for the said tube  $C^5$ . From the above-described arrangement of the pressure-foot  $A^5$ , it is plainly obvious that it is made to press upon and to always firmly hold the file-blank down upon the rolling-block C, to which it is secured, through the action of the weight  $K^5$ ; that, by the collar  $D^5$ , and the circular slotted plate  $L^5$ , the pressure-foot may be adjusted to bear in a direction more or less inclined vertically, and also so as to either extend straight across the file-blank, or at an angle to the width of the same; and furthermore, by hanging the pressure-foot upon the screw-shaft it can be adjusted so as to have its edge, by which it bears upon the file-blank, inclined in a direction across the width, whereby the action of the pressure-foot upon the file-blank can be made to correspond exactly to that of the cutter-tool, which, in case the cutting edge of the tool has been worn away at one end more than the other, is of much importance and advantage; this pressure-foot, according as it is adjusted, affecting the rocking-block G, having the file-blank, and tilting the same either to one or the other side.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The sliding carriage D for the file-blank, arranged to move forward and backward upon the bed-piece A, or its equivalent, when operated through a driving-shaft, Z, to which it is connected by a shaft screw-nut N, screw-threaded shaft O, gears  $P^2$  and Q, shaft R, having ratchet-wheel S, with which engages a pawl, T, that is operated through a pitman-rod, V, hung to an adjustable box W of the crank-arm Y at one end of the shaft Z, substantially as and for the purpose described.

2. The combination, with the file-bed or block, of the notched plate K, for receiving the tang of the file and side clutches or jaws L and M, each arranged and applied to the said block so as to be operated substantially as and for the purpose described.

3. The springs  $O^2$ , constructed and arranged as described, in combination with the lifting beam  $D^2$  and eccentric or cam-pulleys  $T^2$ , substantially as and for the purpose described.

4. The combination, with one or more of the springs  $O^2$ , of the lifting-arm  $W^2$ , arranged with regard to the same as and for the purpose specified.

5. The arm  $f^4$  attached to file carriage D, in combination with the lever  $g^4$ , connection-rod  $h^4$ , catch  $l^4$ , and  $m^4$ , and notched arm  $c^4$  of the beam-shaft  $O^3$ , when all arranged and connected together so as to be operated by the arm  $f^4$ , substantially as described, and for the purpose specified.

The above specification of my invention signed by me this 13th day of July, 1866.

CHARLES VOGEL.

Witnesses:

WM. F. McNAMARA,  
ALBERT W. BROWN.