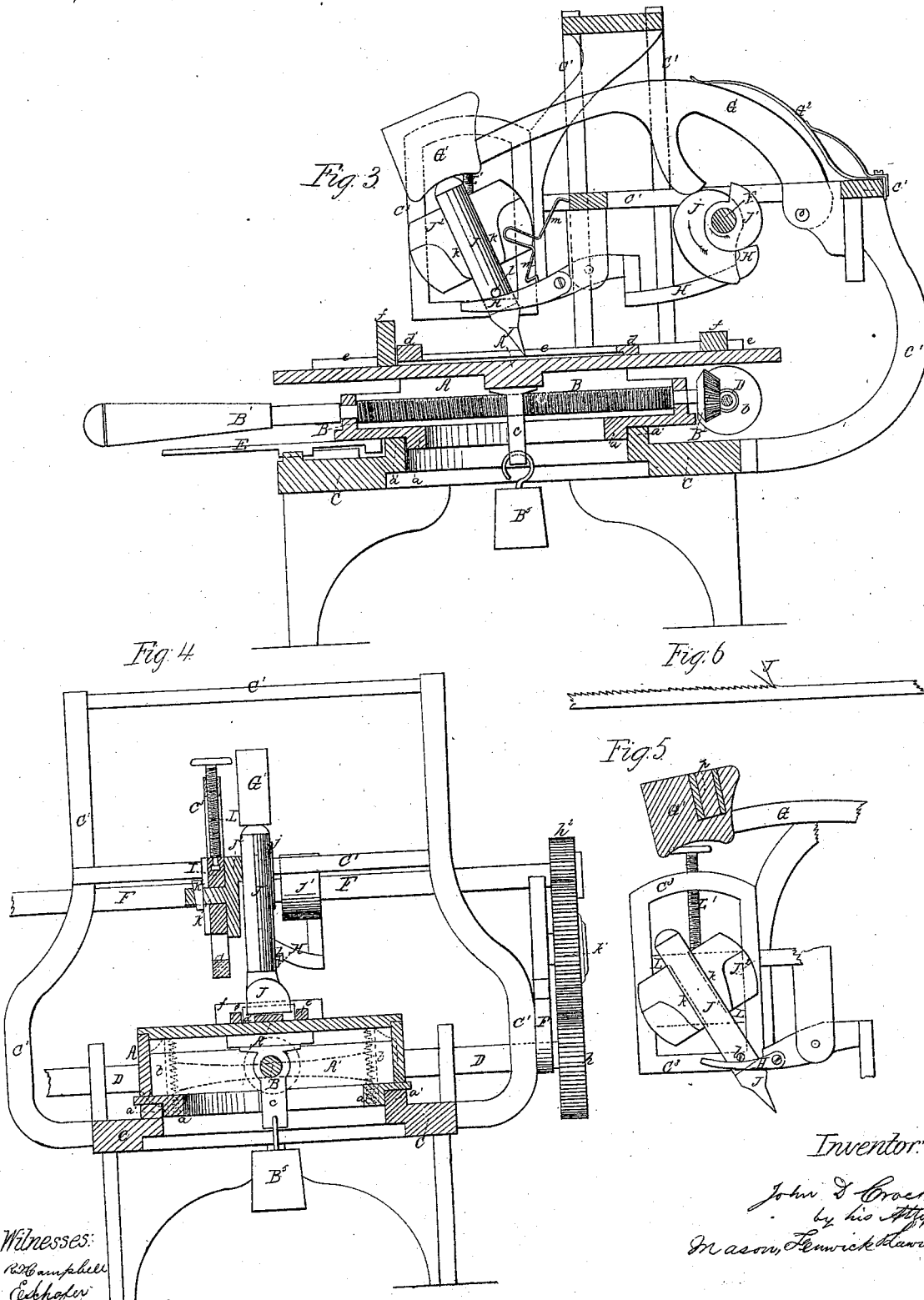


J. D. Crocker,
File-Cutting Machine,
Patented Feb. 28, 1865.

N^o 46,545.



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UNITED STATES PATENT OFFICE.

JOHN D. CROCKER, OF NORWICH, CONNECTICUT.

FILE-CUTTING MACHINE.

Specification forming part of Letters Patent No. 46,545, dated February 28, 1865.

To all whom it may concern:

Be it known that I, JOHN D. CROCKER, of Norwich, New London county, State of Connecticut, have invented a new and Improved Machine for Making Files; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is an elevation of one side of my improved machine. Fig. 2 is a plan view of the machine, showing the file-bed in a position for receiving files to be cut and cutting the first course. Fig. 3, Sheet 2, is a longitudinal section through the center of the machine. Fig. 4 is a transverse section taken in a vertical plane through the forward part of the machine. Fig. 5 shows the tool-holder, hammer, and the lifter in detail. Fig. 6 illustrates the method of forming the burrs or teeth on the file-blanks.

Similar letters of reference indicate corresponding parts in the several figures.

The main object of my invention is to construct a file-cutting machine which in its operation will closely imitate that of cutting files by hand. My machine is constructed in such manner that the chisel can be adjusted and set at any desired angle from a vertical line, and so that it can be adjusted for cutting burrs or teeth on the edges of the files as well as upon the sides thereof. Provision is made for making "single" or "double" cut files, also for setting the teeth or burrs on each face and edge of single-cut files and of one of the courses of teeth or burrs on each of the faces and edges of double-cut files during the operation of forming them upon the blanks, and also for feeding the blanks under the chisel backward or forward, either by hand or automatically, at the pleasure of the operator, all of which will be hereinafter described.

To enable others skilled in the art to make and use my invention, I will describe its construction and operation.

In the accompanying drawings, A represents a horizontal bed-plate, upon which the file-blanks are secured, as will be hereinafter described. This file-bed is mounted upon an oscillating bed, A', in such manner that the former is allowed to receive from a screw-shaft, B, an endwise reciprocating movement for the purpose of feeding the file-

blanks backward and forward under the chisel. The sides of the bed A' are adapted to receive and form guides for keeping the bed A in place. There is a large circular opening through the bottom of the oscillating bed A', which is surrounded by a flange, a, which enters a corresponding flange, a', formed around an opening which is made through the top of the table C. The bed A' rests upon the annular flange a, and is kept in place, though allowed to oscillate in a horizontal plane, as shown clearly in Figs. 3 and 4, Sheet 2. The screw-shaft B, which communicates an alternate reciprocating motion to the file-bed A, as will be hereinafter shown, extends longitudinally through the center of the oscillating bed A', and has its bearings in the vertical ends of this bed, as shown in Fig. 3, Sheet 2. The ends of the shaft B project from the ends of the bed A', and at that end of the machine where the operator should be stationed a long handle, B', is formed on the screw-shaft, while on the opposite end of this shaft a bevel spur-wheel, B², is secured. The shaft B moves the bed A backward; when the wheel B² is in gear with the bevel-wheel b, which is keyed on a shaft, D, that extends transversely across the table C, as shown in Figs. 2 and 4; and when the wheel B² is thrown into gear with the wheel b', the bed A is moved forward. This alternate reciprocation movement of the bed A is effected by the operator oscillating the beds A A', so as to engage the wheel B² with the wheel b, and then with the wheel b'. The connection of the screw-shaft B with the file-bed A is made by means of the hanger c, which is secured rigidly to the bottom of said bed, and through which the shaft passes, as shown in Figs. 3 and 4. The weight B³ may be attached to the hanger c for keeping the file-bed down on its oscillating bed.

The file-blanks are secured in place upon the file-bed A, between the stationary cross-piece d and the movable cross-piece d', which latter is secured to longitudinally-sliding parallel bars e e. (Shown in Fig. 2.) The two bars e e are held down upon the table or bed A by means of two stationary cross-pieces, f f. The tang of a file-blank is inserted under the cross-piece d', and the opposite end of the blank is forced under the fixed piece d by moving the bars e e forward. Recesses are

made in the two pieces d d' for receiving the ends of the file-blanks, and when secured in place the blank is in a line directly beneath the chisel which cuts the burrs or teeth upon it. The holding-pieces d d' being arranged as above stated, it will be seen that they will receive and secure in place file-blanks of different lengths, and at the same time adjust the blanks centrally under the chisel.

As it is desirable to secure the two beds A A' in position during the operation of cutting a blank, I employ a spring-pawl, E, which is applied to the bottom edge of the oscillating bed A', so as to catch into the notches on the table C. The pawl E is located directly under the handle B', so that it can be grasped by the same hand which grasps the handle. The bevel-wheels b b' are keyed to a shaft which receives its motion from a driving-shaft, F, through the medium of spur-wheels h h' h^2 . The spur-wheel h' has its bearings in an adjustable plate, F', which is secured to the upright frame-work C', as shown in Figs. 2 and 4, and which is made adjustable, to admit of the employment of a large or small spur-wheel for increasing or diminishing the relative speed of the two shafts F and D. The driving-shaft F has its bearings in the horizontal portion of the frame C' and receives its motion from any convenient prime motor. This shaft F carries two cams, j and j' . The cam j actuates a hammer-staff, G, which is curved, as shown in Figs. 1 and 3, and which carries on its free end a hammer, G', having its striking-face curved, as will be hereinafter described. The hammer-staff is pivoted at i to frame C', and is acted upon in its downstroke by a spring, G², which will increase the blow. The cam j' operates to depress a curved lever, H, which lifts the chisel after each blow of the hammer, and thus allows the work to be fed under the chisel the required distance after every blow of the hammer.

The chisel J may be made of any suitable form adapted for cutting burrs on the surfaces of file-blanks, it being secured in any suitable manner to the lower end of a vertically-sliding stock, J', which works between the guides k k of an oscillating holder, J². This holder is pivoted, by means of a horizontal pin, k' , to a vertically-adjustable slide, L, which is sustained within an overhanging frame, C³, projecting from the main frame C', as shown in Figs. 1, 3, and 4. The slide L is adjusted up or down by means of a vertical screw, L', which is tapped through the upper portion of the frame C³, and connected by an annular groove and pin to said slide. The oscillating holder has a key, k^2 , passed through its pin k' for the purpose of keeping it in place, and admitting of its ready removal from the machine when necessary. The chisel stock may be removed from this holder J², by drawing the lower end of the chisel forward and slipping it out from between its guides. The hammer G' is adapted for striking the chisel stock when the latter is inclined at different angles, by curving the

under surface of this hammer concentrically, or nearly so, with a point in the projected axial line of the pin k' , when the hammer rests upon said chisel, as shown in Figs. 1, 3, and 5. In other words, it is desired to have the hammer strike the chisel-head as nearly in a line with the axis of the chisel as possible, so as to obtain the full force of the blow. The upper end of the hammer-stock may be slightly rounded, as shown in the drawings, for the purpose of allowing the hammer to strike as near the center of this stock as possible, when the latter is in an inclined position.

In the above description I have referred to a lever, H, for lifting the chisel after each blow of the hammer. This lever projects forward of the chisel, and acts upward against a pin, l , projecting from the chisel-stock. The spring m depresses the forward end of said lever when its rear end is released by the cam j' .

Having thus particularized the several parts of my machine, I will now give a brief description of the operation of making a file.

The file-blank which it is desired to operate upon is secured down upon the bed A by means of the holding devices which I have already fully described. The two beds A A' are adjusted obliquely to the line of the table C and edge of the chisel J, as shown in Fig. 2, so as to give the required angle to the cuts on the file, and also to engage the spur-wheel B² on screw-shaft B with the wheel b on the shaft D. This adjustment throws the screw-shaft B into gear with the main driving-shaft F, and causes the screw-shaft to move the bed A. The operator, who stands at one end of the machine, with his hand grasping the handle B', can adjust the bed A by turning the screw-shaft B when it is not in gear with either of the wheels b b' , and thus commence the cutting at any desired point on the file blank. Simultaneously with the movement of the bed A the hammer G' is started. The rapidity of the blows or the speed of the table A can be increased or diminished for making fine or coarse files by changing the gear-wheel h' , provision being made for that purpose, as above described. When the bed A has moved the required distance in one direction, the second course of teeth are cut on the file by moving the two beds A A', as indicated by the blue line, Fig. 2, and thus engaging the wheel B² on shaft B with the wheel b' . The bed A will now be moved in an opposite direction to that above described, the hammer still continuing in operation. In cutting teeth on files which are "bellied" or tapering it will be necessary to modify the blows of the hammer as the cutting approaches the thin end of the file, and for this purpose I diminish the weight of the hammer by removing a plug, p , which fits within a hole made in the top of the hammer, as already shown in Fig. 5. Several of these plugs may be applied to the hammer G', so that its weight may be diminished considerably or increased at pleasure by removing or applying one or more of said plugs, as occasion de-

mands. The edges of the files may also be burred, when desired, by elevating the slide L and lifter H, and thus accommodating the cutting devices to the width of the files, after which the cutting is performed as above described.

In the operation of cutting files by hand the operator inclines the chisel so as to throw up a trifling ridge or burr. The chisel is immediately replaced on the blank and slid from the operator until it encounters the ridge previously thrown up. The metal is thrown up from the preceding teeth and toward the operator, and the tooth which was last formed is set in the succeeding operation—i. e., the sharp burrs are not left with a curled edge, which would be the case if the cuts were made and the chisel inclined toward the teeth already formed. This operation of setting the teeth I imitate by commencing to cut near the tang of the file and feeding the bed A toward the operator, the chisel being inclined, as represented in the drawings, Fig. 1. In cutting the second course of teeth or burrs the inclination of the chisel remains unchanged, and therefore in the back feed of the carriage the cuts upon the file-blank are from the operator, instead of toward him, and consequently this course of teeth or burrs are not "set."

It is not very essential to have the second course of teeth or burrs set, inasmuch as the first course is set; but in order to set the teeth of the second course it is only necessary to change the inclination of the chisel on its sliding and swinging holder J² so that it will cut toward the operator, as in the forward feed, and in connection with this change of position of the holder to reverse the position of the ends of the file on its carriage. To thus operate the machine the file-holding devices of the carriage and the shape of the striking face of the hammer will have to be modified slightly, so as to meet the requirements of the work to be done. These modifications are merely formal, and will readily suggest themselves to the skilled mechanic. The machine thus modified would admit of the cutting operation for the first course of teeth or burrs being commenced at either the forward or back end of the carriage, and therefore in cutting single-cut files one face or edge thereof can be cut in the forward feed of the blank and another face or edge thereof in the back feed, and in cutting double-cut files the second course can be cut and set in the back feed of the carriage. Again, if it is desirable to not cut during the back feed, any of the approved devices for moving the carriage back independent of the feed-screw might be adopted, and thus cut the second course of teeth or burrs during a second forward feed and during the cutting set the teeth or burrs the same as in cutting and setting the first course. These expedients, however, are optional in the performance of my invention for setting the teeth while the

operation of cutting them is proceeding—a compound operation never before effected with file-machines which employ a horizontal carriage, a nearly vertical chisel, and hammer, substantially as herein described, and represented. In Fig. 6, Sheet 2, I have shown the position of the chisel with respect to the teeth on the file during the act of cutting.

As the teeth of a partially-cut file would be injured by placing them on the hard surface of the bed A, they may be protected by interposing a flat piece of some soft metal, which would preserve the teeth on the side of the file already formed.

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

1. The combination of the oscillating table which carries the file-blanks and gearing, substantially such as described, so that the operation of cutting the teeth or burrs on the blanks may proceed both as the carriage is fed forward and backward, as set forth.

2. The combination of the contrivance E with oscillating bed A' and reciprocating bed A, substantially as and for the purpose described.

3. Extending one end of the feed-screw shaft B beyond the end of the bed A', so as to constitute a handle, B', for enabling the operator to adjust the bed A' longitudinally or laterally at pleasure, substantially as described.

4. Constructing the hammer with a concave face, in combination with a chisel-stock which is susceptible of being adjusted and set at different angles, substantially as described.

5. So constructing a file-machine that its file-supporting carriage can be adjusted after it has moved forward to be fed backward, and during both of said movements the operation of cutting teeth or burrs on file-blanks is performed, substantially as set forth.

6. Cutting and setting file teeth or burrs on blanks by means of a machine which is constructed and operates substantially as herein described.

7. Applying the chisel-stock guide J² to a vertically-adjustable slide or support, L, substantially as described.

8. The chisel-stock holder J², constructed to slide and swing, and also to guide and support the chisel, substantially in the manner described.

9. Providing for adjusting the chisel to cut toward the operator both in the forward and backward feed of the file-carriage, substantially as and for the purpose described.

Witness my hand in the matter of my application for a patent on a file-cutting machine this 2d day of November, 1864.

JOHN D. CROCKER.

Witnesses:

E. SCHAFER,
R. W. FENWICK.