Sheet 1, 4 Sheets.

J. C. Cooke.

File-Cutting Machine.

No. 52,804. Patented Feb. 20, 1866.

Fig. 1.

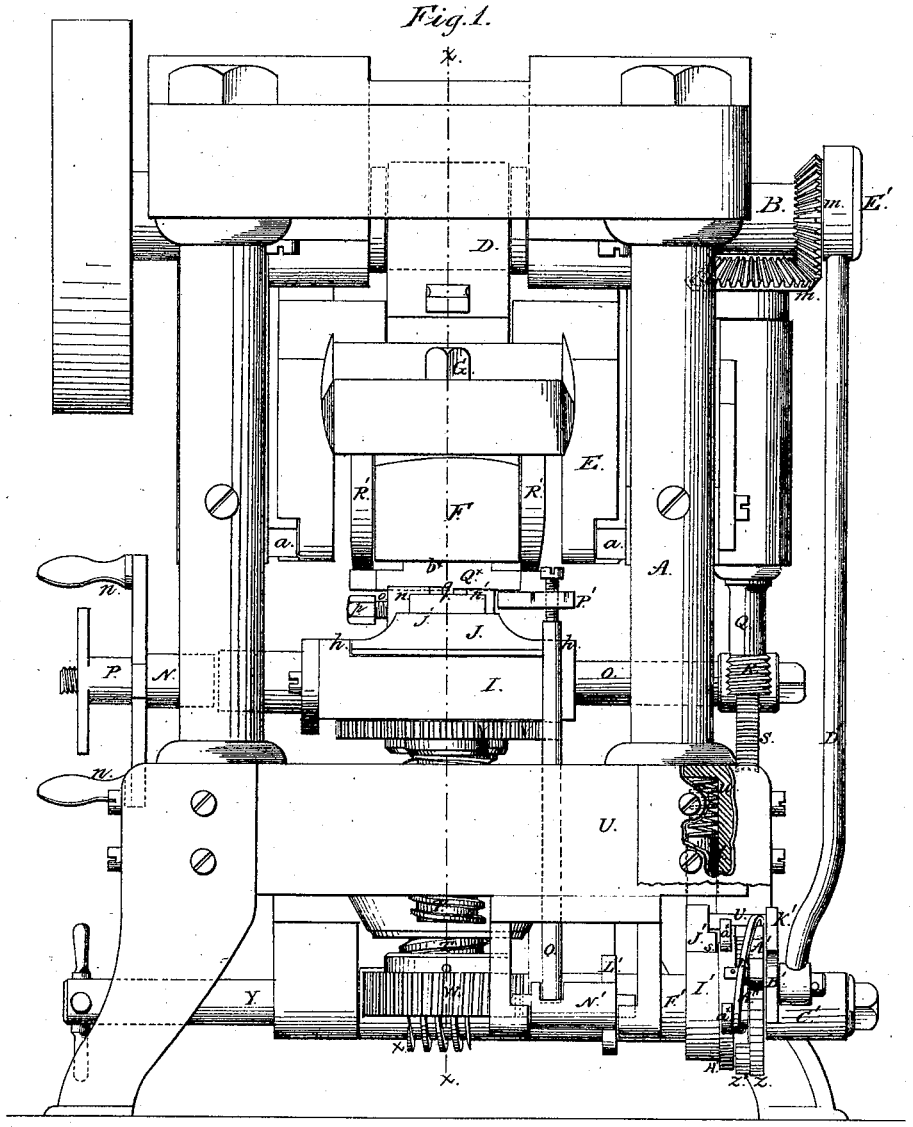

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Fig. 2.

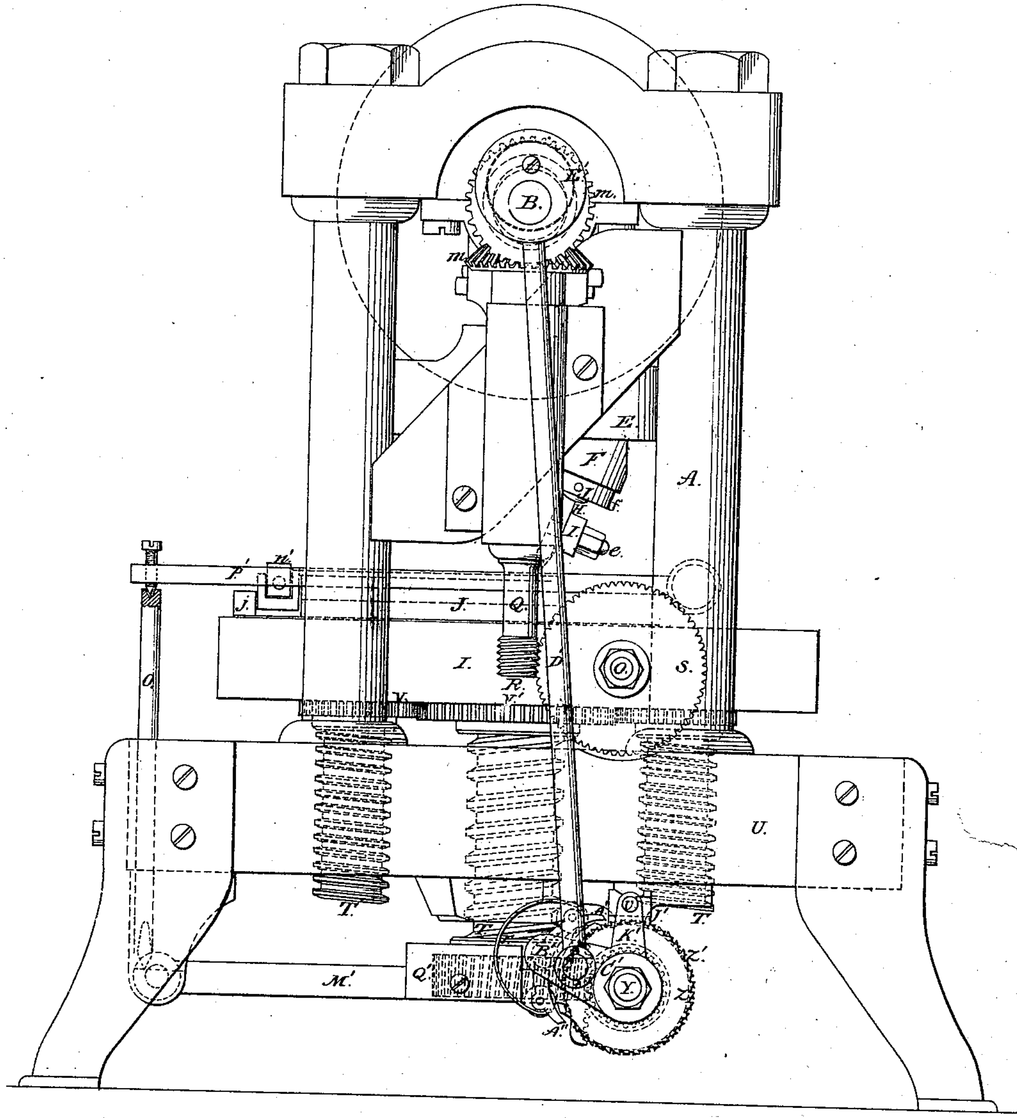

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Fig. 3.

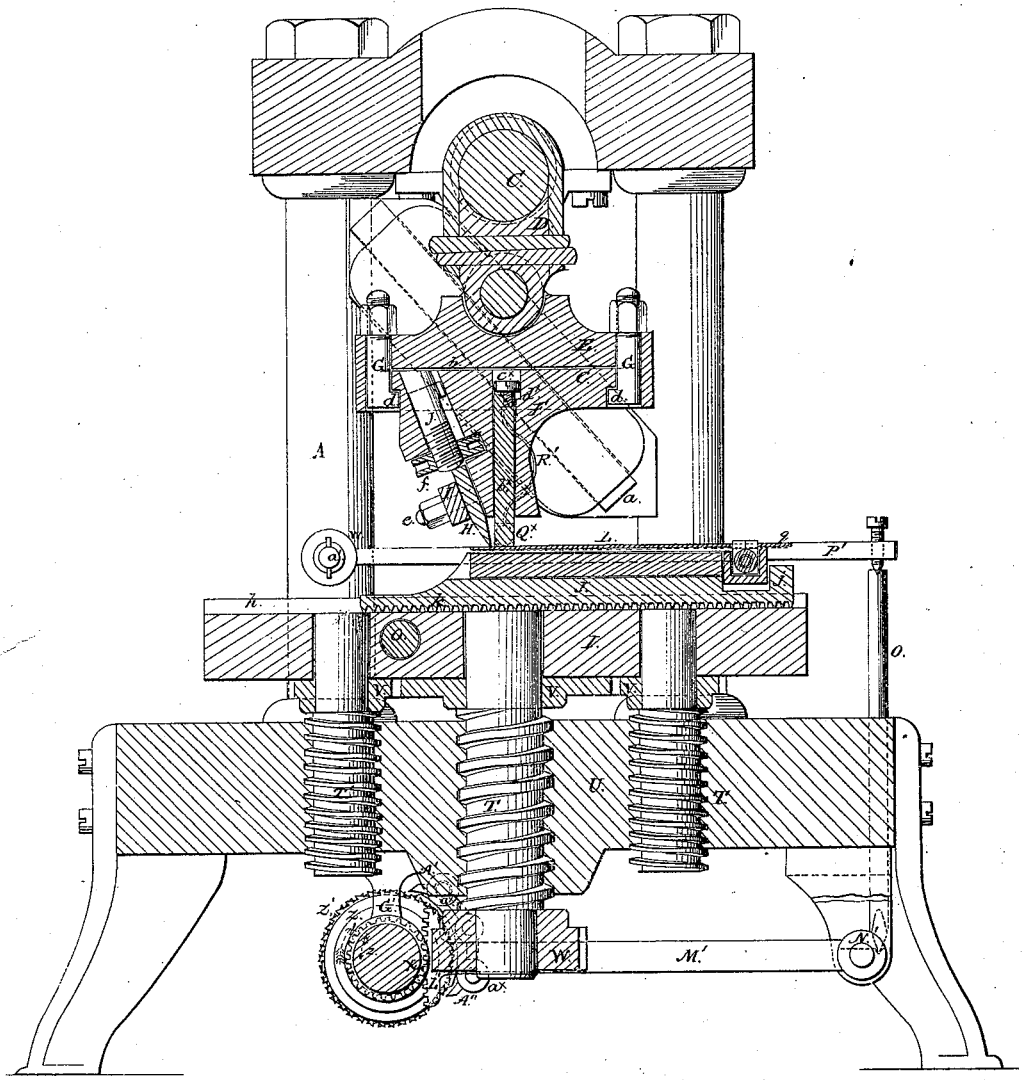

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Fig. 4.

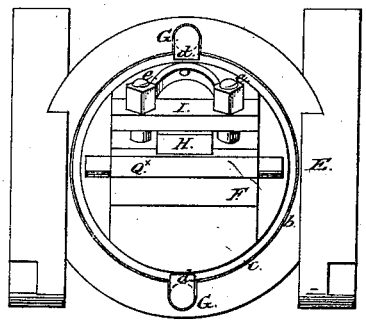


Fig. 5.

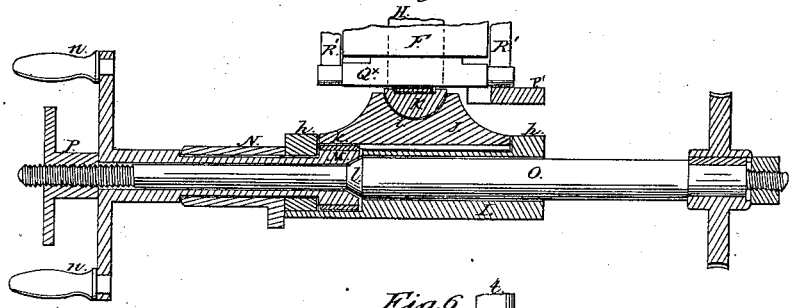


Fig. 6.

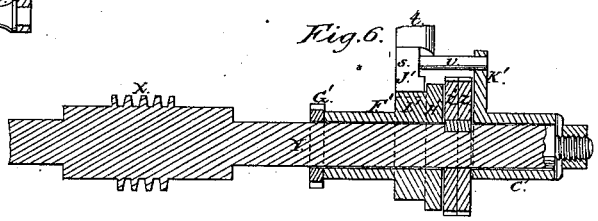
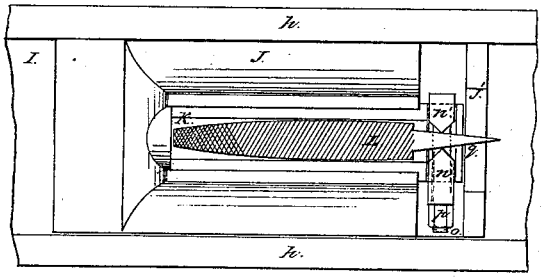


Fig. 7.



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UNITED STATES PATENT OFFICE.

JAMES C. COOKE, OF MIDDLETOWN, CONNECTICUT.

IMPROVEMENT IN MACHINES FOR CUTTING FILES.

Specification forming part of Letters Patent No. **52,804**, dated February 20, 1866.

To all whom it may concern:

Be it known that I, JAMES C. COOKE, of Middletown, in the county of Middlesex and State of Connecticut, have invented a new and Improved Machine for Cutting Files; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, Sheet No. 1, is a rear elevation of my invention; Fig. 2, Sheet No. 2, a side elevation of the same; Fig. 3, Sheet No. 3, a vertical section of the same, taken in the line *x x*, Fig. 1; Fig. 4, Sheet No. 4, a detached bottom view or inverted plan of the cutter-stock; Fig. 5, a detached longitudinal central section of the feed-shaft; Fig. 6, a detached longitudinal central section of the shaft pertaining to the file-adjusting mechanism; and Fig. 7, a detached plan or top view of the sliding file-bed.

Similar letters of reference indicate corresponding parts.

This invention relates to a new and improved machine for cutting files and rasps of all kinds; and it consists in a novel construction and arrangement of a cutter-stock applied to a sliding head in such a manner that the cutter is rendered capable of being adjusted with the greatest facility in the several positions relatively with the file-blank that it is necessary to have in order to cut the file properly.

The invention also consists in a novel manner of securing the file-blank in its bed, whereby the blank may be secured in the bed and the finished file removed therefrom very expeditiously.

The invention also consists in certain means for automatically adjusting the file-bed for the purpose of compensating for any variation in the thickness of the blank, and insuring a cut of uniform depth throughout the entire length of the blank.

The construction and operation of the several parts are described as follows:

A represents a framing, which may be constructed in any proper manner to support the working parts, and having a horizontal driving-shaft, B, in its upper part, on which an eccentric journal or arm, C, is turned. This eccentric C is connected, by a pitman or metallic strap, D, to a sliding head, E, which is fitted on inclined guides *a a* in the framing A, so that it will work up and down in an oblique plane at an angle—say of about forty-five degrees—the head E being operated by the eccentric C and strap or pitman D. This head E is formed with a circular recess, *b*, to receive the upper end of a cutter-stock, F, which is of circular form, or has a circular plate, *c*, at its upper end, and the stock F is secured to the head E by means of bolts G, which have hooks or lips *d* at their lower ends to lap over the edge of the plate *c*, as shown clearly in Fig. 3.

The cutter H is secured to the stock F by means of a clamp composed of a bar, I, and screws *e e*, the latter passing into the stock at each side of the cutter, and the upper end of the cutter bears against a screw, J, which is fitted within the stock in such a manner as to slide therein, and has a nut, *f*, upon it, by turning which the screw may be raised or lowered to adjust the cutter higher or lower, as may be desired. This will be fully understood by referring to Fig. 3.

The cutter H has an inclined position so as to cut the file-blank regularly, and it will be seen from the above description that the means employed for securing the cutter-stock F to the sliding head E admits of the stock being readily turned by loosening the bolts G, so that the cutter H may be adjusted to make a more or less oblique or diagonal cut in the file-blank, as may be desired, the stock, when adjusted, being secured in position by tightening the bolts G, which is done by screwing up the nuts *g* of said bolts. The stock F, it will be seen, when thus adjusted to regulate the position of the cutter H relatively with the file-blank, turns around a vertical axis—as the upper circular plate *c* of the head—is in a horizontal plane or parallel with the file-bed, and abuts against a portion of the head E, which is also parallel with the file-bed. If these three surfaces are parallel with each other and the axis of the stock F at right angles therewith, whether vertical or not, the stock F may be turned, and the cutter H adjusted to make a more or less oblique cut on the file-blank, and the cutting-edge of the cutter will always be parallel with the upper surface of the file-blank, and consequently a proper relative position of said parts always preserved.

I represents a bed, in the upper part of

which a slide, J, is fitted between guides *n n*. This slide J has a half-round groove, *i*, made in it, to receive a semi-cylindrical bed, K, on which the file-blank L is placed, the rear end of said bed K bearing against an upright lip or ledge, *j*, at the rear end of the slide J. (See Figs. 2, 3, and 7.) The under side of the slide J is provided with a rack, *k*, into which a pinion, M, gears, and this pinion is on a tubular shaft or sleeve, N, which is fitted loosely on a shaft, O, the latter passing transversely through the bed I, and formed with a conical shoulder, *l*, which, when the slide J is moved along to feed the file-blank to the cutter H, is drawn snugly within a conical seat or recess in the outer side of the pinion M by means of a nut, P, on the outer end of the shaft O, said nut bearing against the outer end of the tubular-shaft or sleeve N. (See Fig. 5.) By this means the pinion M is connected with the shaft O and made to turn with it, in order to move the slide J as the power is applied to shaft O. This shaft O is operated from a vertical rotating shaft, Q, at one side of the framing A, by means of a screw, R, and a worm-wheel, L, and the shaft Q is rotated from the driving-shaft B by means of bevel-gears *m*. (See Fig. 2,) The object in having the pinion M connected with the shaft O by friction, as described, is to admit of said pinion being readily disconnected from shaft O, for the purpose of moving back the slide J when it has reached the extent of its forward movement. To effect this the nut P is loosened, and the tubular shaft or sleeve N turned by means of handles *n*, at its outer end.

The cutter H, it will be seen, has a positive movement, and will penetrate into the file-blank L an equal distance at each cut, or, in other words, the depth of the cuts will be all precisely alike, provided the file-blank be of an equal thickness throughout its entire length, and the feed of the slide J will, of course, be uniform, so as to insure the cuts being made in the blank at equal distances apart. This feed is continuous, and a great advantage is obtained by that, as the file-blank under the feed movement is pressed against the cutter H when the latter is performing its cut, and a sharp burr is, in consequence, thrown upon the edge of each tooth.

The file-blank L is secured on the bed K by means of two jaws, *n n'*, one, *n*, of which is stationary, and the other, *n'*, movable. The movable jaw *n'* is provided with a rod, *o*, which passes longitudinally through the fixed jaw *n*, and has a screw and a nut, *p*, on its outer end. These two jaws are made to grasp the tang *q* of the file-blank by adjusting the jaw *n'*, through the medium of the screw and nut, as will be understood by referring to Fig. 7.

The jaw *n* is not designed to be permanently fixed, but to be capable of being adjusted in different positions in the bed K, so as to suit tangs of different sizes or widths, and admit of the blanks L being secured centrally on the bed K. This is not a necessity, but it would be preferable to have the file-blank at the center of the bed K.

Having now described the parts pertaining to the operation of the cutter, the feed movement of the file-blank, and the mode of securing the blank in its bed, I will proceed to describe the vertical adjusting movement of the file-blank, in order to compensate for the varying thickness of the blank should such variation exist.

It will be observed that the cutter is operated by a positive means, and, as previously stated, will penetrate the file-blank to a certain and equal distance at each cut provided the blank is of an equal thickness throughout. The file-blanks, however, will generally vary in thickness, and in order to compensate for this variation the following means is employed: The bed I is fitted upon three screws, T T' T', all of which are shown in Fig. 3. These screws pass vertically through the base plate U of the framing and work in internal threads therein, and the three screws are connected by gears V. On the lower end of the central screw, T, there is keyed a worm-wheel, W, into which a screw, X, on a horizontal shaft, Y, gears, and from which shaft motion is communicated to the central screw, the latter communicating motion to the screws T' T' by the gears V. By means of these screws it will be seen that the bed I may be raised and lowered, and this movement is designed to compensate for any variation in the thickness of the file-blank. If the blank is low at a certain point where the cutter H is to act upon it, the bed I, and consequently the file-blank, will be raised, and said parts lowered when the cutter is to act upon a part of the file-blank which is high. This bed I is raised and lowered to accomplish this result at the proper time by the following mechanism: On the shaft Y there are firmly keyed two ratchets, Z Z', which have their teeth in opposite positions, one, Z, being designed for a right and the other, Z', for a left hand movement. These ratchets are operated at the proper time by means of pawls A' A'', which are pivoted to an arm, B', the latter projecting from a sleeve or collar, C', placed loosely on shaft Y. The arm B' is connected to the lower end of a rod, D', the upper end of which is connected to an eccentric, E', on one end of the driving-shaft B. The pawl A' engages with the ratchet Z, and the pawl A'' engages with the ratchet Z', said pawls having a spring, *r*, applied to them to keep them in contact with the ratchets.

On the shaft Y there is placed, loosely, a collar or sleeve, F', having at one end a pinion, G', and at the opposite end a cam, H', and a concentric collar, I', adjoining the cam. (See Figs. 1 and 6.)

J' represents a brake, which is composed of a shoe, *s*, at the lower end of a rod, *t*, which is fitted vertically in the base-plate U, and has a spiral spring, *u*, bearing against its upper end, as shown clearly in Fig. 1, said spring pressing the shoe *s* upon the collar I' suffi-

ciently hard to prevent any casual turning of the sleeve or collar F′. The sleeve or collar C′, to which the pawl-arm B′ is attached, has another arm, K′, projecting from it at right angles, or nearly so, with the arm D′, and this arm K′ has a pin, *v*, extending from it at right angles. This pin *v*, when the arm K′ is moved upward, passes underneath the outer edge of the shoe *s* and raises it from the collar I′, so as to leave the sleeve or collar F′ free to turn. This liberation of the sleeve or collar C′ is effected when the cutter is nearly down, just before it comes in contact with the file-blank, the eccentric E′ being placed on shaft B in such a position as to effect that result. The liberation of the sleeve or collar C′ admits of its being turned on the shaft Y in order that the cam H′ may act upon the pawls A′ A″ and throw them out, either or both, from the ratchets Z Z′, when necessary, the pawl A″ being thrown out from the ratchet Z′ when the bed I is to be lowered, so that the other pawl, A′, may engage with the ratchet Z, and the pawl A″ being made to engage with ratchet Z′ when the bed requires to be raised. The pawls A′ A″ have rollers $a^{\times}$ attached, against which the cam acts.

The sleeve or collar F′ is turned by means of a toothed segment, L′, engaging with the pinion G′. This segment is at the inner end of an arm, M′, the outer end of which has a hub, N′, attached, provided with journals which work in pendent bearings underneath the base-plate V. Upon this hub N′, at the rear of its journals, the lower end of a vertical shaft, O′, rests, and upon the upper end of said shaft the rear end of a bar, P′, rests, the front end of said bar provided with an eye, *w*, to fit on a horizontal pin, *a*′.

The arm M′ has a sliding weight, Q′, upon it, which, when the arm M′ is free, has a tendency to throw the segment L′ down and rotate the sleeve or collar F′ in the direction indicated by arrow 1, (see Fig. 3,) and by said movement cause the cam H′ to throw the pawl A″ out from the ratchet Z′, and to allow the pawl A′ to be in contact or engage with the ratchet Z, so that the shaft Y may be turned in the proper direction to lower the bed I, and consequently the file-blank. The bed I is raised by moving the segment L′ upward so as to rotate the sleeve or collar F′ in the direction indicated by arrow 2, and cause the cam H′ to throw the pawl A′ out from ratchet Z and admit of the pawl A″ engaging with ratchet Z′. This moving upward of the segment L′ is effected by a downward pressure on the bar P′, which is given it by means of what I term a "feeler." This feeler is composed of a horizontal bar, $Q^{\times}$, which is underneath the cutter-stock F, and has springs R′ attached to its ends, the upper ends of said springs bearing against the upper part of the cutter-stock F. This bar or feeler $Q^{\times}$ has a stem, $b^{\times}$, attached vertically to it, which stem passes up into the stock F and is allowed to slide therein, the stem being secured by a screw, $c^{\times}$, which prevents it from dropping too low, in consequence of coming in contact with a shoulder, $d^{\times}$. (See Fig. 3.)

The bar or feeler $Q^{\times}$ is directly in front of the cutter H, and it is the medium through which the rising and falling movement of the bed I is effected in a proper or accurate manner.

When the cutter H descends the feeler $Q^{\times}$ will strike the file-blank L first if the latter be too high, and the strings R′ will yield or give so as not to prevent the descent of the cutter-stock F, and as soon as the sleeve or collar F′ is liberated by the elevation of the brake J′, which is done at every revolution of the driving-shaft B, the segment L′ drops under the gravity of the weight Q′, and the pawl A′ engages with ratchet Z, and the shaft Y turns in the proper direction to lower the bed I, the bar P′ being raised, as the segment L′ drops in contact with the bar or feeler $Q^{\times}$. This liberation of the sleeve or collar F′ takes place only once at each revolution of shaft B, and is liberated for a short time only, the brake J′ descending upon collar I′ as soon as the pin *v* of arm K passes said brake, and in case the bed I requires more than one upward movement to bring the file-blank L to a proper level plenty of time is allowed for so doing, as the bar or feeler $Q^{\times}$ is in advance of the cutter H.

In case the file-blank is too low the bar or feeler $Q^{\times}$ will first strike the bar P′ and press it down, thereby raising the arm M′ and segment L′, and causing the sleeve or collar F′ to turn in the direction indicated by arrow 2, Fig. 3, and the cam H′ to throw the pawl A′ out from ratchet Z, and the pawl A″ to engage with ratchet Z′, so that the shaft Y will be turned in the proper direction to lower the bed I.

When the file-blank is at a proper level the arm M′ will be about in a horizontal position, and the cam H′ against the rollers of both pawls, so as to keep both of them free from their respective ratchets Z Z′.

Thus by this arrangement the file-blank is always kept at a proper or uniform level, so as to have the same relative position with the cutter, however much the blank may vary in thickness.

I do not claim a rolling or semi-cylindrical bed for the file-blank, for that is an old device; neither do I claim the arrangement described for giving the backward movement to the slide on which the file-bed is placed, for that, also, is old; nor do I claim, broadly, or in the abstract, the giving of the cutter a positive movement; but

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

1. The securing of the cutter-stock F to the reciprocating head E in the manner shown, or in any equivalent way, so that said cutter-stock may be turned and adjusted at any point within the scope of its movement to give the

cutter a proper oblique position with the file-blank, and the cutter always have its cutting-edge in a horizontal plane.

2. Placing the reciprocating head E between inclined guides *a a*, so that said head will work in an inclined direction, when said head, thus arranged, is used in combination with a cutter-stock, F, applied in the manner substantially as described.

3. The securing of the file-blank L to the bed K by means of the jaws *n n'*, arranged substantially as set forth.

4. The raising and lowering of the bed I to compensate for the varying thickness of the file-blank L, by means substantially as described.

5. The means employed for communicating from shaft B motion intermittently and in either direction to the shaft Y, which turns the central screw, T—to wit, the two ratchets, Z Z', pawls A' A'', operated from the shaft B, as shown and described, the sleeve or collar F' on shaft Y, with pinion G', and the cam H' and collar I' upon it, the brake J', and the segment L', all arranged substantially as set forth.

6. The bar P', connected with the arm M', having the toothed segment L' attached, when said parts are used in connection with a bar or feeler $Q^{\times}$, connected with cutter-stock F' and all arranged to operate substantially as described.

7. The bar or feeler $Q^{\times}$ applied to the cutter-stock F in the manner substantially as set forth.

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