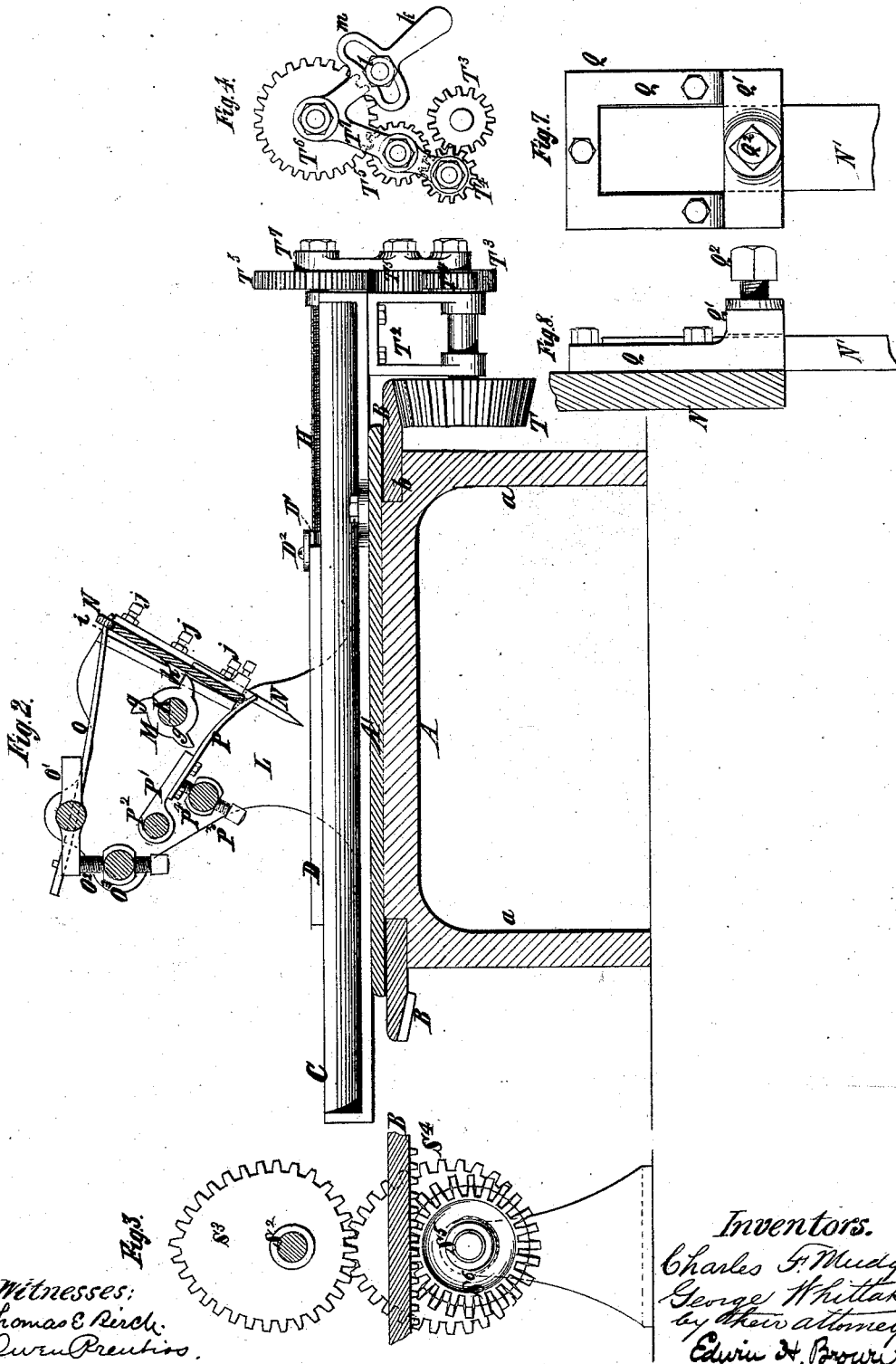


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File-Cutting Machine.

No. 203,065.

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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN FILE-CUTTING MACHINES.

Specification forming part of Letters Patent No. **203,065**, dated April 30, 1878; application filed
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To all whom it may concern:

Be it known that we, CHARLES FREDERICK MUDGE and GEORGE WHITTAKER, both of Brooklyn, in Kings county, and the State of New York, have invented certain new and useful Improvements in Machines for Cutting Files, of which the following is a specification:

Our invention consists in an adjustable tang-holder for embracing the side edges of the tangs of file-blanks, and for pressing down upon and holding said tangs against vertical motion, whereby tangs of different-sized blanks may be conveniently secured in place without manipulation of the holder.

Our invention also consists in the combination, with the cutter or its holder, of springs and peculiar means for adjusting said springs to impart the blows and effect the rebound of the cutter, as may be desired.

Our invention also consists in details of construction to be hereinafter explained.

In the accompanying drawing, Figure 1 is a plan or top view of a machine embodying our improvements. Fig. 2 is a central vertical section of the base-piece cutter supporting and actuating mechanism, and a side view of the traveling bed, the swiveling-frame supporting the same, and the gearing for imparting motion thereto. Fig. 3 is a side view of the mechanism for imparting the intermittent feed to the said traveling bed. Fig. 4 is a view of the gearing for transmitting motion to the said traveling bed from the shaft deriving motion from the rim or annular gear-wheel before alluded to. Fig. 5 is a plan of portions of the traveling bed, the swiveling-frame supporting the same, and other parts connected therewith, all on a larger scale. Fig. 6 is a transverse section of said traveling swivel-frame, including an end view of the adjustable tang-holder on the same scale. Fig. 7 is an enlarged front view of the tool-holder, and Fig. 8 is a side view thereof.

Similar letters of reference designate corresponding parts in all the figures.

A designates the base-piece of our machine, which is of circular form, is supported on legs *a*, and is provided on the upper surface with a circumferential rabbet, *b*, for the reception of a rotary rim or annular wheel, B, provided

on the under side with a series of gear-teeth, and constituting an inverted annular gear-wheel.

A' designates a plate secured to the base-piece A by screws, bolts, or otherwise, and overlapping the inner portion of the inverted annular gear-wheel B, so as to secure and hold it in the rabbet *b*.

C designates a frame, preferably semicircular internally, wherein a traveling bed, D, preferably semicircular externally, is supported, and has a longitudinal motion imparted to it, for the purpose of presenting file-blanks to the cutter N' employed to produce teeth thereon. This frame C is preferably so secured to the base-piece A, or cap-plate A' thereof, that it may be adjusted laterally for the purpose of presenting file-blanks at different angles to the cutter for producing teeth. We have shown it as provided with lugs *c*, and bolts *d*, passing through said lugs and entering one or other of a series of screw-sockets, *e e*, on the cap-plate A, for securing it in different positions.

The traveling bed D works on guides or ways E, (see particularly Fig. 6,) which are secured in place by caps F, and may be adjusted to different vertical positions by means of set-screws G impinging thereon, so as to tilt or admit of the tilting of the traveling bed D transversely, in order to adapt it to present the surface of file-blanks properly to the cutter N', notwithstanding any irregularities of thickness which may exist in said file-blanks, and insure the teeth being produced by the said cutter uniformly throughout the width of the blanks.

It is obvious that if a file-blank were a little thicker at one of its edges than the other, the cutter, providing its lower edge be exactly horizontal, would not uniformly act on the file-blank throughout its width without some provision for compensating for such irregularities of the thickness.

The provision afforded by our adjustable guides enables the traveling bed to compensate for such irregularities; and hence these guides form an important feature of our invention.

H designates a worm or screw supported in the swivel-frame C, extending concentri-

cally through the traveling bed, and engaging therewith, so that when turned it will move the said traveling bed longitudinally in either direction. D^1 designates a semicircular screw-threaded nut, pivoted at one end to the forward end of the traveling bed D , so that it may be swung into contact with the worm or screw H , in order to cause said bed to derive motion therefrom, or may be swung out of contact with said nut to admit of the said bed being stopped or moved backward, as may be desirable. D^2 is a locking-piece consisting of a button adapted to be adjusted over the nut D^1 , when it is engaged with the worm or screw, to lock it in position. I (see particularly Figs. 5 and 6) designates an automatically-adjustable tang-holder, consisting of a stock piece or frame, and three bolts, I' , actuated by springs, so as to automatically impinge against the side edges and top of a tang of a file-blank inserted in the stock-piece or frame between them. These bolts will adapt themselves to tangs of various widths and thicknesses automatically; hence this tang-holder obviates all manipulations for securing tangs of different sizes in place. J J' designate devices for securing the body of the file-blanks in place. They consist of a T -piece, J , adapted to impinge against one side of the file-blank and be secured in different positions upon the traveling bed D by means of a bolt, f , passing through a slot in its shank, and of a lever, J' , having an eccentric head capable of being forced against the opposite edge of the file-blank, and securing said file-blank tightly in position. K designates the driving-shaft of the machine. It is supported in standards L , erected on the cap-plate A' of the base-piece A , and carries a tripper-wheel, M , provided with a series of tripping-toes or arms, g , engaging with a stud or projection, h , extending from a cutter-head, N , adapted to move up and down in guides i , arranged on the standards L at an angle to the traveling bed D . Preferably these guides i are so constructed that the cutter-head may have play transversely, and be adjusted at different angles, in order that the angle of the teeth formed on the blank may be modified, as may be desirable. We have shown said guides for this purpose provided with set-screws j , impinging against the said cross-head, and these devices form a convenient and simple means for adjusting the cutter-head.

O designates a spring, by which the blow of the cutter is produced. It consists, in the present instance, of a flap-spring, fitting within a pivotal saddle, O^1 , supported by the standards L , and impinges upon the upper portion of the cutter-head N , so that, after the release of said cutter-head from the tripper-wheel M , it will be impelled downward with energy.

O^2 designates a set-screw, supported in a stretcher or cross-bar, O^3 , connecting the standards L , and impinging against the rear portion of the saddle O^1 , so that by turning said set-screw said saddle may be adjusted or tilted,

in order to deflect the spring O more or less and regulate the force exerted by it on the cutter-head N , in order to regulate the blow of the cutter N^1 for different qualities of file-teeth.

P designates springs impinging against the lower edge of the cutter-head N in such manner as to raise the same and effect the rebound of the cutter N' quickly after it shall have struck the file-blank subjected to it. This spring P is intended to be very much lighter or weaker than the spring O , so as not to materially counteract the action of the latter upon the cutter-head N . It is shown as being secured to an arm or plate, P^1 , extending from a shaft, P^2 , supported by the standards L , and as being adjusted by means of a set-screw, P^3 , supported in a cross-bar or stretcher, P^4 , uniting the standards L . By turning said set-screw P^3 the force exerted by the spring P may be regulated at pleasure.

The cutter-holder (see particularly Figs. 7 and 8) which we prefer to use consists of a frame, Q , adapted to embrace the end and side edges of the shank of the cutter R , and a strap, Q^1 , extending across the shank of said cutter, and carrying a set-screw, Q^2 , whereby said shank may be securely clamped.

S designates a gear-wheel, mounted on the driving-shaft K , outside of the standards L , and engaging with a pinion, S^1 , mounted on a shaft, S^2 , on the outer end of which is an eccentric gear-wheel, S^3 . This gear-wheel S^3 is preferably heart-shaped, and engages with a similarly-shaped gear-wheel, S^4 , mounted on a shaft, S^5 , carrying a beveled pinion or wheel, S^6 , which engages with and imparts motion to the inverted annular gear-wheel B intermittently—or, in other words, with an alternate fast movement and dwell. The said inverted annular gear-wheel B engages with a beveled wheel, T , mounted on a shaft, T^1 , supported by a bracket or brackets, T^2 , extending downwardly from the swivel-frame C supporting the traveling bed D . At the outer end of the shaft T^1 is a pinion, T^3 , with which engages one of a train of wheels, T^4 T^5 T^6 , carried by a swinging frame, T^7 , whereby motion is transmitted to the worm or screw H , for imparting motion to the traveling bed D . This frame T^7 may be adjusted by a hand-piece, k , to throw the said train of wheels T^4 T^5 T^6 into or out of gear with the said gear-wheel T^3 , and the said frame may be secured in different positions by means of a bolt, l , passing through a loop or yoke, m , so that it may clamp and hold the same in different positions. By shifting the train of wheels T^4 T^5 T^6 into or out of gear with the wheel T^3 motion may be imparted to the traveling bed D ; or the said bed may be stopped at pleasure. Another advantage afforded by this adjustable train of wheels is that it enables a larger or smaller gear-wheel to be substituted for the gear-wheel T^3 , so as to impart a different speed to the traveling bed D .

By substituting for the gear-wheel T^3 a gear-

wheel sufficiently large, and swinging the train of wheels T⁴ T⁵ T⁶ sufficiently aside, a reversal of the feed of the said bed may be attained.

The alternate fast movements and dwells produced by the eccentric gear-wheels S³ S⁴ are transmitted through the inverted annular gear-wheel B, the bevel-wheel T, and the train of wheels T³ T⁴ T⁵ T⁶, to the traveling bed D, and hence the latter is alternately fed forward and allowed to stop while the file-blank thereon receives the blows of the cutter; wherefore the teeth produced on the file-blank are not damaged, as they would otherwise be, from the shifting of the file-blank during the contact of the cutter with it.

It will be seen that, by our invention, we provide for holding the traveling bed carrying the file-blanks under the cutter stationary during the blows of said cutter; that we provide for adjusting the feed of the traveling bed so as to space teeth differently upon the file-blank; that we provide for adjusting the said bed at angles, in order to produce file-teeth at different angles on a blank; that we provide for regulating the force of the blow of the cutter through the adjustment of its actuating-springs, so as to produce coarse or fine teeth upon a file-blank; and that we provide for adjusting said cutter, through the adjustment of its carrying-head, so that it shall strike the file-blanks at different angles and produce different qualities of teeth thereon.

We prefer to cut teeth on file-blanks from

tang to toe, instead of from toe to tang, (the old way,) as thus we obviate the destruction of the fiber of the metal and are enabled to produce a superior file.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination, with a traveling bed, of an adjustable holder for tangs of different-sized file-blanks adapted to automatically impinge against the side edges and top of said tangs and hold them laterally and vertically in place, substantially as and for the purpose specified.

2. The combination, with the cutter-head, of the slides permitting lateral play of the cutter-head therein, the springs O, and set-screws j, as and for the purpose set forth.

3. The combination, with the cutter-head M, spring O, pivoted saddle O¹, and adjusting-screw O², substantially as and for the purpose described.

4. The combination, in a file-cutting machine, of a bed, externally of segmental shape, for supporting the file-blank, a carriage corresponding in shape thereto internally, and a feeding worm or screw concentric with said bed, substantially as and for the purpose specified.

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