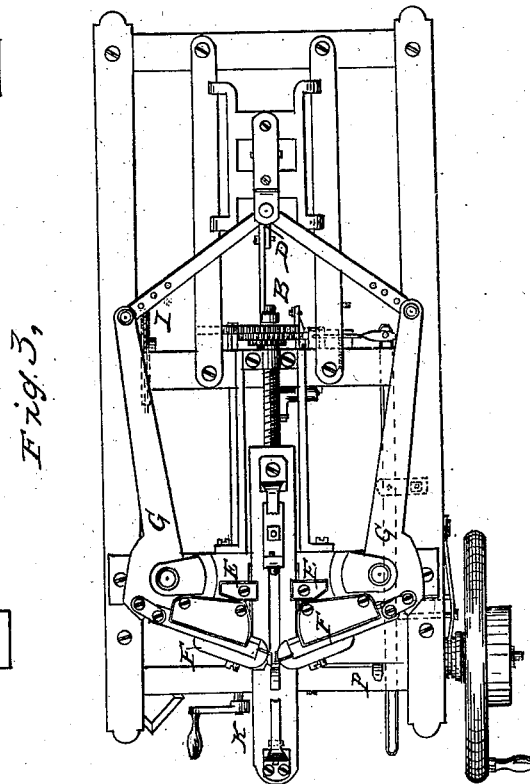
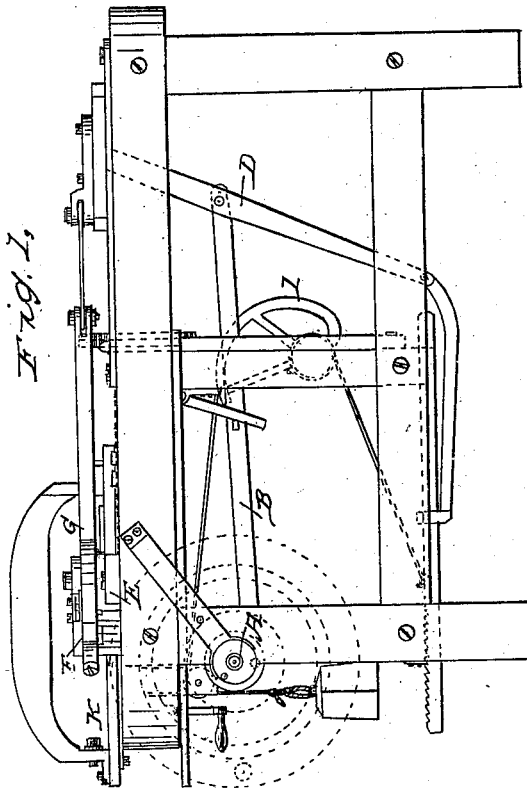
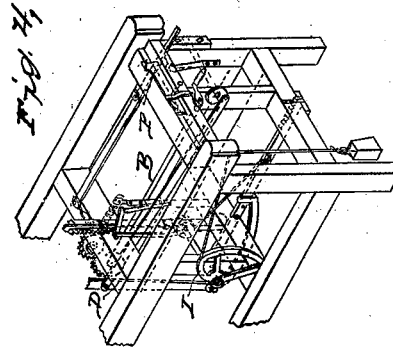
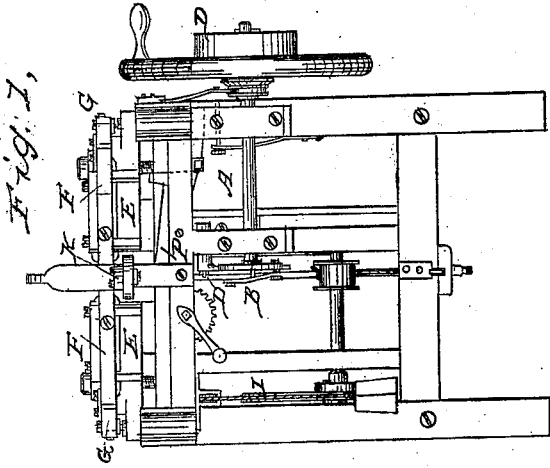


R. WALKER.  
File Cutting Machine

No. 5,149.

Patented June 12, 1847.



# UNITED STATES PATENT OFFICE.

RICHARD WALKER, OF PORTSMOUTH, NEW HAMPSHIRE.

## MACHINERY FOR CUTTING FILES.

Specification of Letters Patent No. 5,149, dated June 12, 1847.

*To all whom it may concern:*

Be it known that I, RICHARD WALKER, of Portsmouth, in the county of Rockingham and State of New Hampshire, have invented a new and useful Machine for Cutting Files, which machine is to be operated by any adequate power applied to a revolving shaft; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1, is a front end elevation, showing the length of the main shaft, and a view from the front end of the operative parts. Fig. 2, is a side elevation thereof showing the frame and operating parts as seen from side to side. Fig. 3, is a top view of the machine, showing the form of the levers and leverage with the various movements connected therewith, in the respective figures, the same letters of reference are used to designate the same parts. Fig. 4, is a detached view of parts of the machine.

The frame of the machine is made of wood of suitable strength and dimensions to sustain the operative parts hereinafter described and is about four and a half feet long, two feet wide, and three feet high, which dimensions may however be varied to suit convenience, but I esteem the foregoing a good size.

The main shaft A, through which the motion is communicated, has its bearings on the front side of the posts that constitute the front end of the machine, on one end of said shaft, outside the frame is attached a fly or balance wheel, to the outer side of which is fastened the pulley that communicates motion to the machine, these both turn loose on the main shaft and are made to turn the shaft by means of a clutch sliding on a feather on the shaft, between the fly and the frame, the clutch having dogs or teeth to mesh into the hub of the fly wheel, and a neck receiving the prongs of a fork, one end of which is attached by a movable joint to the side of the frame, there is also a connection from the fork to the steel spring on the inside of the front post, by which means the clutch is kept unshipped when the machine is not wanted to be in motion, on the other end of the main shaft midway of the machine in front, is fastened a cast iron flanch containing a crank pin, said flanch

having a slot to receive the crank pin in such a manner that it may be moved from the center outward far enough to form a circle varying from three to six inches in diameter, in order to accommodate any required length of movement of the levers hereinafter described.

From the crankpin, motion is communicated by a sweep B midway of the machine lengthwise to a pin in the middle of a vertical lever D, consequently said vertical lever will operate with about equal force at each end, the object of which is, that the upper end may give motion to the levers producing the cut, and the lower end receive the resistance necessary to give the required depth of cut and in order that this may be advantageously done, and the resistance be a suspended weight, the lower end of the lever D, is connected to a longitudinal iron slide in the middle and lower part of the machine, the connection is formed by an intermediate lever or sweep, forming a movable joint on the end of the lever D, and extending forward under the slide to near its middle, where it is connected to the slide in such a manner as to allow the hindmost end of the sweep to move up and down, accommodating the variation of the vertical lever in allowing the slide to move back and forth about six inches, the object of which is, to change the range of motion at the top end of the lever to accommodate the variation in the thickness of a file.

The slide to which the lower end of the lever is attached is held back against the power that produces the cut by having a cord attached to its upper edge toward its fore end, and passing backward around a stationary roller in the middle of the frame above the slide, the roller is about three inches diameter, or so that turning less than once around it shall allow the cord to unwind sufficiently to accommodate the slide the whole length of its forward movement, on one end of the shaft of the roller, is fastened a cam marked I, one end of another cord fastened to the base of the cam winding outward on its periphery extends to the front of the machine near the top passing over a friction roll, as seen at I, Fig. 1, bearing on its fore end a suspended weight of sufficient power to produce the required depth of cut by acting as resistance on the lower end of the lever D, and as the lever by changing its range of motion when the

slide moves forward loses power to produce the same depth of cut, in consequence of changing the position of leverage on top of the machine, the cam is so formed as to gain the loss of power from the suspended weight in the same proportion. The slide is held forward when gaining a forward movement by teeth cut in its top edge at the forward end, coming in contact with a small dog fastened to the front girt, being kept lifted against it by the upward direction in which the cord draws as seen in Fig. 2.

I now proceed to describe the operative parts that lie on the top of the frame and their connection with the foregoing. E, E, is a cast iron bedplate fastened across the front end of the frame on the top, it is about seven inches wide at the middle, and of sufficient thickness to hold all the strain of cutting files as they pass across its center, it is made straight on the backside, its forward side projecting forward from near its ends toward its center at an angle of about twenty two degrees or so as to form a proper direction for the chisels to move in order to raise a proper tooth on the file. F, F, are two chisel holders, made of square iron about ten inches long, by one and a half square, and made double at their fore-ends, the two parts being screwed together something in the form of a vise holding in the mouth of each a small chisel about one eighth of an inch thick, and set angular to fit the range of file teeth, these slide back and forth on the projecting angle of the bedpiece, being confined to the same, by having feathers on their under and upper sides made to fit grooves in clamps screwed to the bedplate, their position is such that in their operation the edges of the chisels nearly meet at the center, only admitting the thickness of the file in cutting, they receive their impulse back and forth by the vibration of the levers G G, being held against and to their fore ends by a connecting strap fastened to each.

The levers G G are of cast iron about two feet long and are placed in a horizontal position lengthwise the machine, parallel with the outer ends of the chisel holders, having their fulcras about three inches back of the same, the fulcras of the levers consists of a bolt or pin passing down through a cap on the bedplate which forms a clasp for the lever, and also through the lever and bedplate, thus forming a secure fulcras and socket to hold the levers against the strain. The levers G G are connected in their movement at their hindmost ends near the middle of the machine by having a wrought iron plate or bar in the end of each, and making each other at the center between the levers, so as to form a hinge or elbow joint, these plates are about one and a half inches wide, by three eighths thick and move freely at

their outward ends on a pin in the ends of the levers being also provided with different bearings for the same pin or order to take the chisels farther apart to accommodate the cutting of edges of files, the inward ends move freely on one common center, the ends overlapping each other, they being held together by a metal clasp or socket with a pin passing through the whole, this clasp or socket is made fast on the top of a sliding carriage on the hindmost end of the machine, the carriage is made of cast metal frame work about ten inches long and five inches wide, being supported between two plates of metal extending from the back to middle girt of machine and screwed to the top of them, the inmost edges of the plates fitting to grooves in the carriage and forming bearings for it to slide on, and to the under side of this carriage is attached the top end of the vertical lever D, by which it receives its motions back and forth in accordance with the revolutions of the main shaft, thus it will be seen, that when the elbow joint is carried backward, it will draw the hindmost ends of the levers G G inward equally alike, taking the chisels back from their work, and when the elbow joint is brought forward to nearly a straight line between the ends of the levers, they will then have attained their greatest power; bearing equally alike on the opposite sides of the file that is being cut, and just in proportion as the elbow joint varies from coming up to a straight line, will the chisels vary from going to the same depth, consequently this explains the utility of variation in the range of motion of the vertical lever D, as connected with the slide, it being to accommodate any variation in the thickness of the work, and as the elbow joint loses power to produce the same pressure from the same amount of resistance on the vertical lever, and that in a certain ratio as the elbow joint varies backward, the manner the resistance is increased so as to render a compensating power is heretofore described in the construction of the cam.

I further proceed to describe the apparatus that hold the file to be cut passing it along between the chisels in correspondence with the other movements so as to produce any required number of teeth to the inch. K is a plate of cast iron, about two feet long, four inches wide and three fourths of an inch thick, having on its top side at the front end a head socket to receive a round center puppet, in which is screwed the shank end of a file, and toward the back end of the plate, is an opposite head containing a small revolving socket made to fit and hold the point of the file, these two heads allow the file to turn over either way. The last named head is fitted to a groove in the plate so that it is capable of being moved

back and forth to accommodate the different length of files, in a similar manner to a tailstock of a lathe, and to make the plate sufficiently stiff to resist any spring by pressure, it is provided with an elliptical arched brace, extending from the front end, upward and over to the back end of the plate, being bolted fast to the plate at each end, and made high enough to give room for the work between the lower side of the arch and top side of the plate, this plate and apparatus is placed at a right angle across the middle of the bedplate in a cavity made to receive its bigness so that it has its bearings on the top at both sides of the bedplate in such a manner as to permit it to slide back and forth longitudinally of the frame passing the file directly between the chisels, and is operated by a screw, placed parallel with the plate on its under side, the nut being fastened to the hindmost end of the plate, and the resisting pivot of the screw fitted into the back edge of the bedplate, the other bearing being at the extent of the required slide is supported by the middle cross girt of the frame and has two prongs extending to the bedplate and made fast to it by screws.

The screw is made square threaded, winding four times to the inch, being about one and a half inch diameter, and has a small ratchet wheel made fast on its shank outside its bearing at the middle of the machine, and next to that is a spur gear five inches in diameter, made to turn loose on the same shaft and bearing on one side a small pawl fitting the teeth of the ratchet, this spur is connected with a perpendicular toothed rack which vibrates up and down, causing the spur to pawl the ratchet at every upward movement of the rack the bearings in which the rack slides are supported on the side of an upright piece of wood, whose lower end is hinged to the bottom cross girt and the top end to the shipper in such a manner that the top end may be vibrated by the shipper sufficiently to mesh and unmesh the rack from the spur, and as the downward movement of the rack is caused by its own weight the upright is perforated with several holes at the lower end of the rack, in which a movable pin is inserted, gaging the rack in its downward movement so as to stop it at any given point, pawling the number of teeth required. The moving of this pin is all that is required to alter the number of teeth to the inch on the file. The upward movement of the rack is caused by having an iron strap or chain, connecting its lower end with one end of a quadrant or bent lever whose fulcrum is placed near the top of the frame between the rack and the front end, having the end that is connected to the rack at a right angle with it, and the other end extending downward in

such a manner as to receive an impulse from a stud on the middle of the sweep B, at every backward movement of the same, which causes the lever to lift the rack and turn the screw.

The rack is fitted to unmesh from the spur, at the same time that the clutch unmeshes from the fly wheel, which is effected by the shipper, it having a connection with both.

The shipper is a small straight lever hinged by the middle to the under side of the top timbers of the frame, and extending from its connection with the rack (as described) to the front end of the machine where it is operated by hand, and is also provided with a bearing against the fork that operates the clutch in such a manner that the same motion of the shipper, meshes or unmeshes both the fly wheel and the rack, and when both are meshed the shipper is held in that position against the force of the spring that operates upon the fork by a latch on the top front girt.

The latch P, consists of a small piece of metal plate, hinged at the middle in such a manner that one end may drop against the shipper when the machine is meshed, and the other end be elevated so that a stud on the underside of the plate K, shall trip it and unmesh the machine just at the time required.

To provide means for drawing the apparatus that holds the file back after it has gone through once cutting, also for setting the same for another operation, there is made fast on the extreme end of the screw shank, contiguous to the feeding a gear of the same dimensions meshing one of its own size, whose axis has its bearings on the under side of the top girts and extends to the front end of the frame where it is supplied with a crank to be operated by hand.

Operation: The shank of the file to be cut, is first secured firmly into the round center puppet which serves as a handle, it is then placed in the sockets of the heads on the plate or carriage, which being drawn forward so as to bring the chisels to bear on the point or thinnest part of the file, and a weight being suspended that is just heavy enough to drive the chisels to a proper depth into the file, the main shaft being caused to rotate the sweep B, by its connection with the vertical lever D, carries back its top end together with the center of the elbow joint, which draws the chisels back from the work, and in the same motion the stud on the sweep comes in contact with the lever connected with the toothed rack, lifting the same and setting the screw the required distance for the next cut, the remaining half evolution takes the chisels forward, driving them into the file, making one cut on each side at every evolution, the machine

feeling the force of the suspended weight of every cut, and if the file increases in thickness it will jog the weight upward, letting the slide that holds the lower end of the vertical lever catch another notch and that varying the range of motion of the elbow joint will cause the chisels to recede and yet retain the same force as heretofore described and when the cutting is completed to the shank of the file, the machine unships of its own accord and stops operating; if the file is to be cross cut it has to be passed between chisels set angular the other way, my machine being supplied with two sets of chisels and chisel holders made to fit the same bearings, which will not be necessary when two machines are used. The foregoing is the description of a machine to cut flat files, but I contemplate by the addition of one more lever and chisel holder to make it capable of cutting the three faces of a three squared file at one and the same time. The nature of my invention consists in

constructing a machine to cut two sides of a file at the same time and by one and the same motion by pressure on the chisels, instead of a blow by a hammer, the power of pressure being a suspended weight, arranged in such a manner as to give any required depth of cut in a more regular and uniform way than by a blow or otherwise.

Having thus fully described my machine, and pointed out the manner in which the same operates, what I claim as my invention therein and desire to secure by Letters Patent, is—

The combination of the weight, cam, slide, and dog with the carriage, toggle joint, and cutter levers for the purpose of cutting files by pressure substantially in the manner herein set forth.

RICHARD WALKER.

Witnesses:

ORLANDO YEATON,  
JOHN E. BAILEY.