J. K. Barker,

File-Cutting Machine,

No. 49,214. Patented Aug. 8, 1865.

Fig. 16.

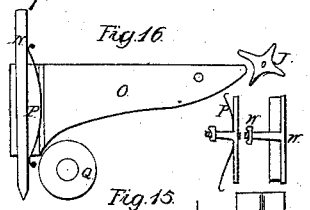


Fig. 17.

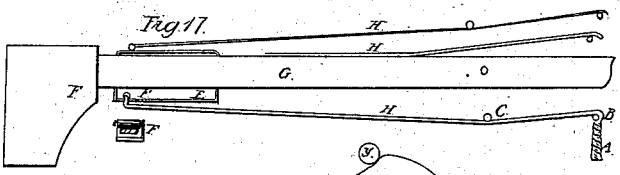


Fig. 15.

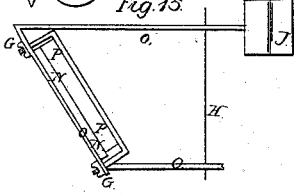


Fig. 14.

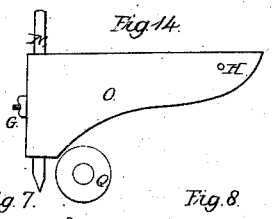


Fig. 13.

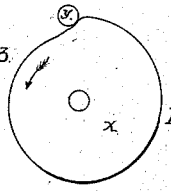


Fig. 12.

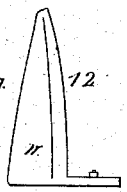


Fig. 11.

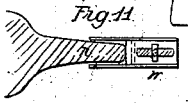


Fig. 6.

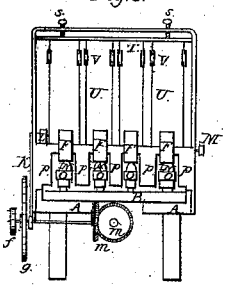


Fig. 7.

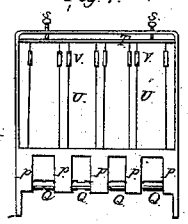


Fig. 8.

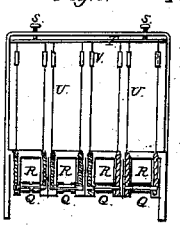


Fig. 10.

Fig. 9.

Fig. 4.

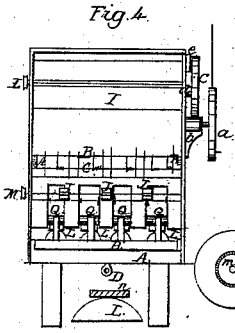


Fig. 5.

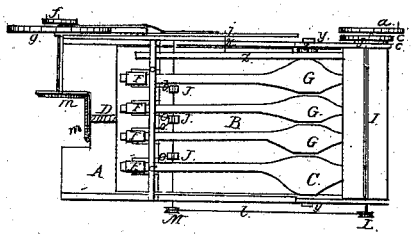


Fig. 3.

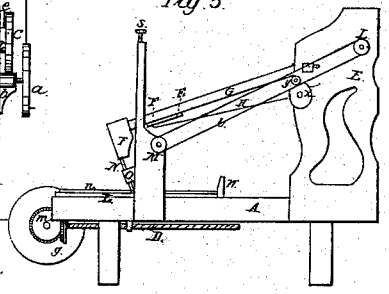


Fig. 1.

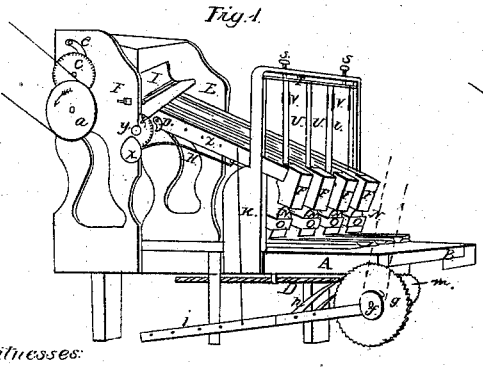
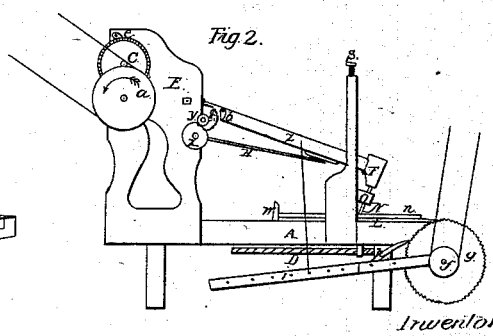


Fig. 2.



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UNITED STATES PATENT OFFICE.

JAMES K. BARKER, OF LAWRENCE, MASSACHUSETTS.

FILE-CUTTING MACHINE.

Specification forming part of Letters Patent No. **49,214**, dated August 8, 1865.

To all whom it may concern:

Be it known that I, JAMES K. BARKER, of Lawrence, in the county of Essex and Commonwealth of Massachusetts, have invented a new and useful Machine for Cutting Files; 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 perspective view of the machine. Fig. 2 is an elevation of one side of machine. Fig. 3 is an elevation of the other side. Fig. 4 is an elevation of one end of machine. Fig. 5 is a plan of the machine. Fig. 6 is an elevation of the other end of machine. Fig. 7 is a frame firmly attached to the bed of the machine, to which is attached the rollers Q, the spiral springs R, the cutter-holders O, and the fan-wheels J. Fig. 8 is the same frame, showing rollers Q, spiral springs R, and the rods U, &c., to press upon the springs. Fig. 9 is an interior longitudinal elevation of the machine. Fig. 10 shows the manner of adjusting the rods U, which bear on the spiral springs R. Fig. 11 represents plan of stand for the shank of the file to bear against. Fig. 12 represents a side elevation of same. Fig. 13 represents a cam-wheel to regulate the force of the springs H under the hammer-handles. Fig. 14 represents a side elevation of chisel-holder. Fig. 15 represents plan of chisel-holder. Fig. 16 is an interior longitudinal elevation of chisel-holder. Fig. 17 represents side elevation of hammer and the springs to give additional force to the blow of the hammers.

A is the bed of the machine, and is intended, when in use, to rest on a stone. A has a border on each side raised higher than the general level of its surface, and serves to keep the feeding-carriage B in its place. The bed A and the feeding-carriage B can be made of any width desirable to furnish room to work any number of hammers at the same time in the same machine, and to cut any series of files that may be desirable at the same time and in the same machine.

B is the feeding-carriage, its under surface resting on the upper surface of the bed A, and is moved by the screw D. On B are carried the file-blanks when being cut.

E E are firmly attached to the bed A on each edge of it, and are high enough to receive the hammer-handles G at their proper elevation, which is at an inclination of about twenty degrees to the horizon.

F F are hammers, and move on an axle passing through each handle G, and fastened into the sides of the machine in E E.

H H are springs placed either above or below the hammer-handles, as seen in Fig. 17, to give additional force to the blow of the hammers above to force down the blow of the hammer, or below to draw down the hammers, and thus increase the force of the blow. I shall adopt the springs below the handles. One end of each spring is fastened to the rod B, which passes from one side of the machine to the other, from E to E. (See Fig. 4.) Said rod is supported or rests on the spiral springs A, which are attached to each side of the machine on the inside of E E. These spiral springs A are there to give greater elasticity to the springs H. The springs H then pass under the rod C, or they may wind around it, as convenience may dictate. The other end of the springs H are attached to the hammer-handles by means of a roller, F, at the end of each spring H, so that the under side of the roller F shall rest on the upper side of a plate, E, attached to each hammer-handle. The rollers F serve to lessen the friction when the hammers are in motion, as the rollers F will then roll along the plate E and back each time the hammers rise or drop.

The rod C, Figs. 4 and 17, passes from one side of the machine to the other, passing through E E in a vertical slot, so that it may rise or fall as it is pressed upon. On the ends of this rod C as an axle, and on each side of the machine, is placed the cam-wheels X. They are put on so as to turn freely on this axle C.

Just above the cam-wheels X, and bearing on the circumference of these cam-wheels X, are two small wheels, W, on each side of the machine on E E. The wheels W are attached immovably to the ends of a rod, which passes from one side of the machine to the other through E E, and is made to work easily in a socket in E E, but not loosely. Upon this last-described rod is a ratchet-wheel, and which is also fastened immovably to the rod last named, and is placed at the side of the feeding-arm Z,

with a catch, D, attached to said feeding-arm Z, and is so adjusted as to take cogs enough in the ratchet and at each movement of the feeding-arm Z to cause the cam-wheels X to make one revolution during the cutting the length of the file once.

The feeding-arm Z is moved by the fan-wheel I. The movement of the arm Z causes the catch D to act on the ratchet-wheel, and which causes it to turn, and with it the small wheel Y, which turns the cam-wheels X by cogs or by friction. The cam-wheels X have a circumference just equal in length to the length of the file to be cut. One side or one-half of the circumference of each of these cam-wheels X is a circle. The other part of the circumference is a spiral. These cam-wheels X are on the ends of the rod C, above described as an axle, and are intended to regulate the force of the blow of the hammers by causing the springs H to increase in stiffness gradually in cutting the file from the point of the file to the ball or about the middle of the file.

The position of the small wheels W and the cam-wheels X at the commencement of the cutting of the file—viz., at the point of the file—is as seen in Fig. 13. The circumferences of the small wheels W are nearer to the axle of the cams X or to C than at any other time during one revolution of the cams X. Consequently it would bear less at that point than at any other on the springs H, thus causing a lighter blow at the point of the file. As the machine moves the cam-wheels turn (as the cutting proceeds) in the direction of the arrows. The springs H continue to stiffen, because the distance between the circumference of the wheels W and the axle of the cam-wheels X or C increases, and, pushing C down gradually until we pass from the spiral part of the cams X to the circular part, we shall then have cut to the ball of the file, and the springs H have attained to their greatness stiffness or power to cause a heavy blow, they will continue of the same stiffness through the cutting of the file, because the distance from the circumference of the wheels W to the axle of the cam-wheels X will continue the same while passing the circular part of the cam-wheels X. When the file is cut through once the cam-wheels X will have made one revolution, and the wheels W and the cams X are in the same position as when we commenced to cut. It will not be necessary to change these cam-wheels to correspond to the small variation in the length of the file-blanks, as if the cam-wheel X was calculated for a twelve-inch file one that was fourteen inches could be cut just as well by stopping the movement of the cam-wheels X anywhere on its circular part by throwing out the catch D from the ratchet, &c.; or if the file-blanks are of an even width their whole length, requiring the same blow the whole length of them, we can set the cam-wheels X at any point of their circumference to give such a blow as may be desired, the catch D being thrown away from the ratchet, &c.

I is a fan-wheel which raises the hammers. The axle of the fan-wheel I passes through the machine from side to side through E E. (See Figs. 4 and 5.) On one end of the said axle is attached the pulley L, or gearing, to move the fan-wheels J. On the other end of the said axle, and just outside of the machine, is the ratchet-wheel *d* (see Fig. 4) and catch *e*, working in the same, for the purpose of holding the hammers and chisels stationary part way up during the time that the carriage B is moving back and the file-blanks are adjusted on the carriage B, and at any other time when necessary. The next, C, is on the same axle of the fan-wheel I, and is geared into the small geared wheel *b*. The power to move the machine is applied to the wheel *a* on the same axle with the small geared wheel *b*.

O is a chisel-holder, as seen in Figs. 14, 15, and 16, and is made in two parts. The outside is a bar of iron of suitable width and thickness, and is bent so that the back shall be about forty-five degrees inclined to one of its sides and about one hundred and thirty-five to the other side, one or both of the sides to be long enough to reach to the fan-wheels J. The other interior part is a similar plate to the outside—that is, it is made of a bar of iron, (see Figs. 16 and 14,) to which is attached the springs P, or an elastic substance, as rubber. Screws are attached to the plate W, to pass through the back of the holder *o* on each side of the chisel's edges. The chisel rests against the back of the holder on a smooth surface.

In front of the chisel is the plate W, with the spring or elastic substance attached, and is drawn up more or less tight against the chisel by the thumb-screws G, which show on the back of the chisel-holder, the spring or elastic substance bearing directly against the chisel on the side of the chisel next to the tooth of the file.

The object of the spring or elastic substance placed in front of the chisel is to allow the chisels a small forward movement as they enter the file, and thus allow the chisel to throw up the tooth of the file—particularly useful in cutting heavy coarse files.

The chisel-holder *o* is attached firmly to the frame (see Figs. 6, 7, and 8) by an axle, H, and must be attached at several points in the length of the axle H to the said frame, to prevent any vibration of the chisel. The said chisel-holder *o* is raised up by the fan-wheel J, which is of the same form exactly as the fan-wheel I, but of smaller diameter, and is made to turn on its axis just as often by means of the pulley L on the axis of the fan-wheel I and the pulley M on the axle of the fan-wheel J. These two pulleys are of exactly the same size and form, having the belt *l* passing from one to the other, so that when I makes one revolution J will make one also, and when

properly adjusted the chisel-holder with the chisel will commence to rise exactly at the same point of time that the hammers commence to rise, and so continue any length of time; or the same may be done more surely perhaps by three geared wheels of equal size and gear—one in place of each pulley L and M, the other placed intermediately between the two.

Q (see Figs. 7, 8, 9, 14, and 16) are rollers attached to the frame 7 and 8, and are placed so as to roll just in front of the chisel on the side next to the tooth of the file. The axle of each roller moves in a vertical slot up and down, according to the pressure upon them, in the tubes *p* of the frame, Figs. 7 and 8. The spiral springs R R just fit the inside of the tubes *p*, moving up or down against the side of said tubes, according to the pressure upon them. A part of each spring is below the axle of each roller and a part above each axle. The use of the spring below the roller-axle is to ease the roller from the file-blank when the pressure is removed from above.

The object of the springs above the axles of the rollers is to bear on the axles of the rollers Q, and consequently on the file-blank, keeping it firmly bedded close up to the chisel, and at the same time the springs R will be elastic enough to allow the rollers to roll along the whole length of the file-blank, though it may vary considerable in thickness from the point to the heel.

The springs R are pressed down by means of the rods U, attached to the plate T, and the screws S—that is, the turning of the screws S causes the pressure more or less on the springs and rollers. The object of the rollers Q, springs R, rods U, and screws S is to make sure that the file is firmly bedded at the chisel—the point of cutting.

V are nuts on the rods U, made to receive screws cut right and left, so that when turned one way they will shorten and when turned the other way will lengthen the rods U—a common device in all machines, and is useful here in regulating the lengths of the rods U, and consequently the pressure on the file-blanks *n*.

W, Figs. 11 and 12, are stands at the ends of the shanks of the files for the file-blanks to bear against while cutting. The front part, (see Fig. 12,) against which the file-blanks bear, is curved toward the file-blanks vertically, with a radius equal to the length of the file to be cut, so that if the shank should rise up during the cutting it would have a constant bearing against the stand W and prevent any movement of the file-blank backward during the cutting of the file. The stands W are (see Fig. 11) fastened to the carriage B by a screw working in a slot, so that the stand may be moved by loosening the screw and adjusted.

The machine is fed by the screw D, moved by the bevel-gear M, one of which is on the end of the screw D. The other is on the axle of the feeding-wheel *g*, which is a ratchet-wheel, having the catch *h* acting upon it by means of the feeding-lever *j*, attached to the feeding-arm *z*, or to one of the hammer-handles, by the connecting-rod *l*, and as the feeding-arm rises lifting the feeding-lever, turning the ratchet-wheel *g* by the aid of the catch *h*. There may be any convenient number of catches to the wheel *g*, so placed as to divide the tooth of the wheel into small parts, thus making sure that some one of the catches would act immediately on the tooth, and thus insure an exact feed. It will be perceived that the machine feeds only when the hammers are rising up, and then just far enough for the tooth of the file. The feed for a coarser or finer file is regulated by the moving of the connecting-rod *k* along the feeding-arm *z* and the feeding-lever *i* toward the axle of the hammers for a finer cut, and toward the hammers for a coarser cut. The reason, I suppose, is apparent, for when the connecting-rod *k* is moved toward the axles of the hammers, it being nearer to the center of motion of the hammers, it will cause the feeding-lever *i* to rise less high, and consequently the ratchet-wheel *g* will turn slower than when the connecting-rod is moved toward the hammers, for there is the greatest motion of the feeding-arm and a shorter radius of feeding-lever. Consequently it will cause the ratchet *g* to turn faster.

n is a file-blank, and is cut on the curved surface of a cylinder, L, or on the curved surface of any segment of a cylinder. (See Fig. 4.)

The object of using the curved surface to cut files on is that it insures an even cut across the file, as the curved surface will allow the file to tip a little as the chisel presses onto it, and thus the file-blank will adjust itself to the chisel.

The wheel *f* is attached to the axle of the ratchet-wheel *g*, and is the wheel to which the power is applied to move back the carriage, when the file is cut. Now, when I commence to use my machine, I cause the wheel *a* to turn just enough to raise the hammers and chisels from the file-blanks. I then loosen the rollers from the file-blank by turning the thumb-screws *s*, and then adjust the file-blanks to their beds. I then press the file-blanks down by turning the screws *s* firmly on their beds, and then start the machine by applying the power to the wheel *a*, which moves in the direction of the arrows, and when the file is cut once through I stop the machine when the hammers and chisels are part way up. I then remove the catch *h* from the ratchet-wheel *g* and apply the power to the wheel *f*, which will drive the carriage B back to its first position, and having thrown the catch *h* onto the wheel *g*, and having adjusted the file-blanks as before, the machine is ready to start again.

I claim—

1. The springs R and the rods U to bear upon the springs R, for the purpose herein set forth.

2. The frame, Fig. 7, which is attached to the bed A of the machine, and independent of the carriage B, in combination with the chisel-

holders *o*, rollers Q, the springs R, and the means of operating the springs and chisel-holder.

3. The springs H and the cam-wheels X, arranged as described, to regulate the force of the springs H, for the purpose herein set forth.

4. The described improved machine for cutting a series of files at the same time in the same machine by a corresponding series of hammers and chisels, consisting, essentially, of the combination of the elements above claimed, and operating substantially as herein set forth and described.

JAMES K. BARKER. [L. S.]

Witnesses:
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J. H. DANA.