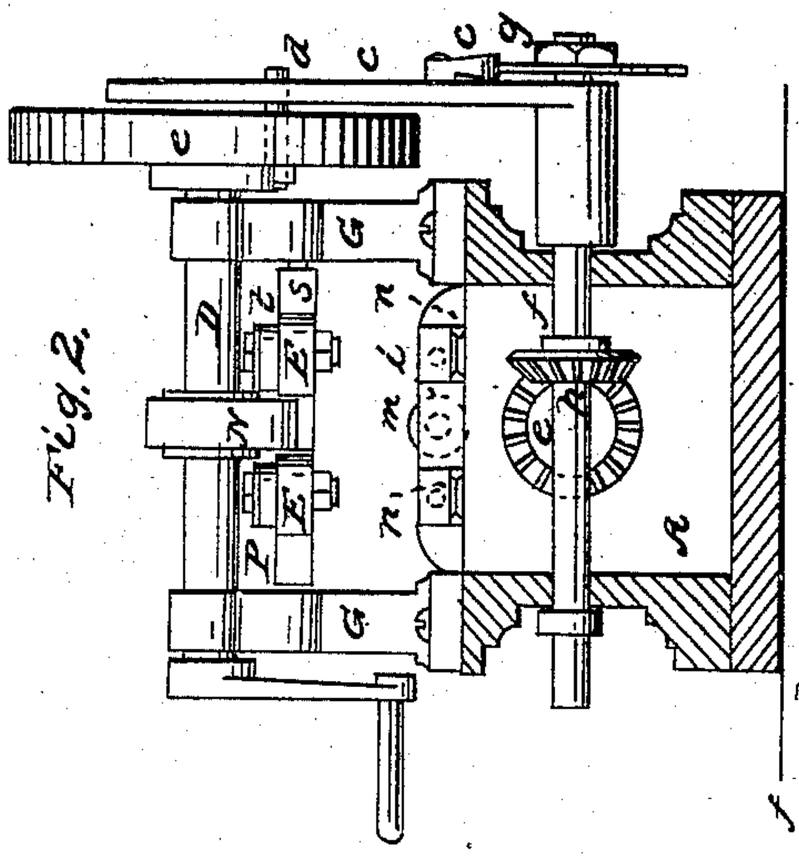
ROTHERHAM & HOLDEN.

File Cutting Machine.

No. 54,606. Patented May 8, 1866.

Fig. 2.



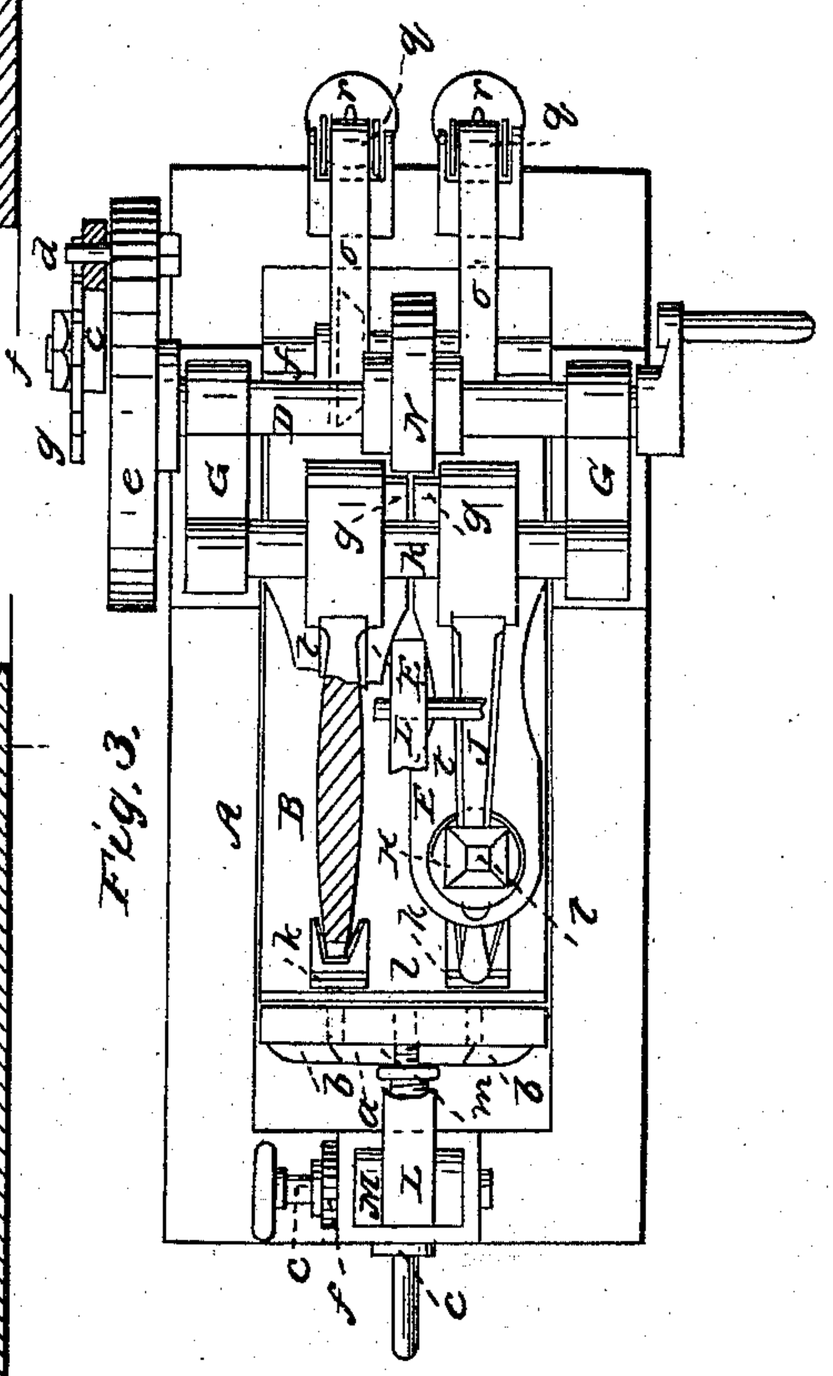
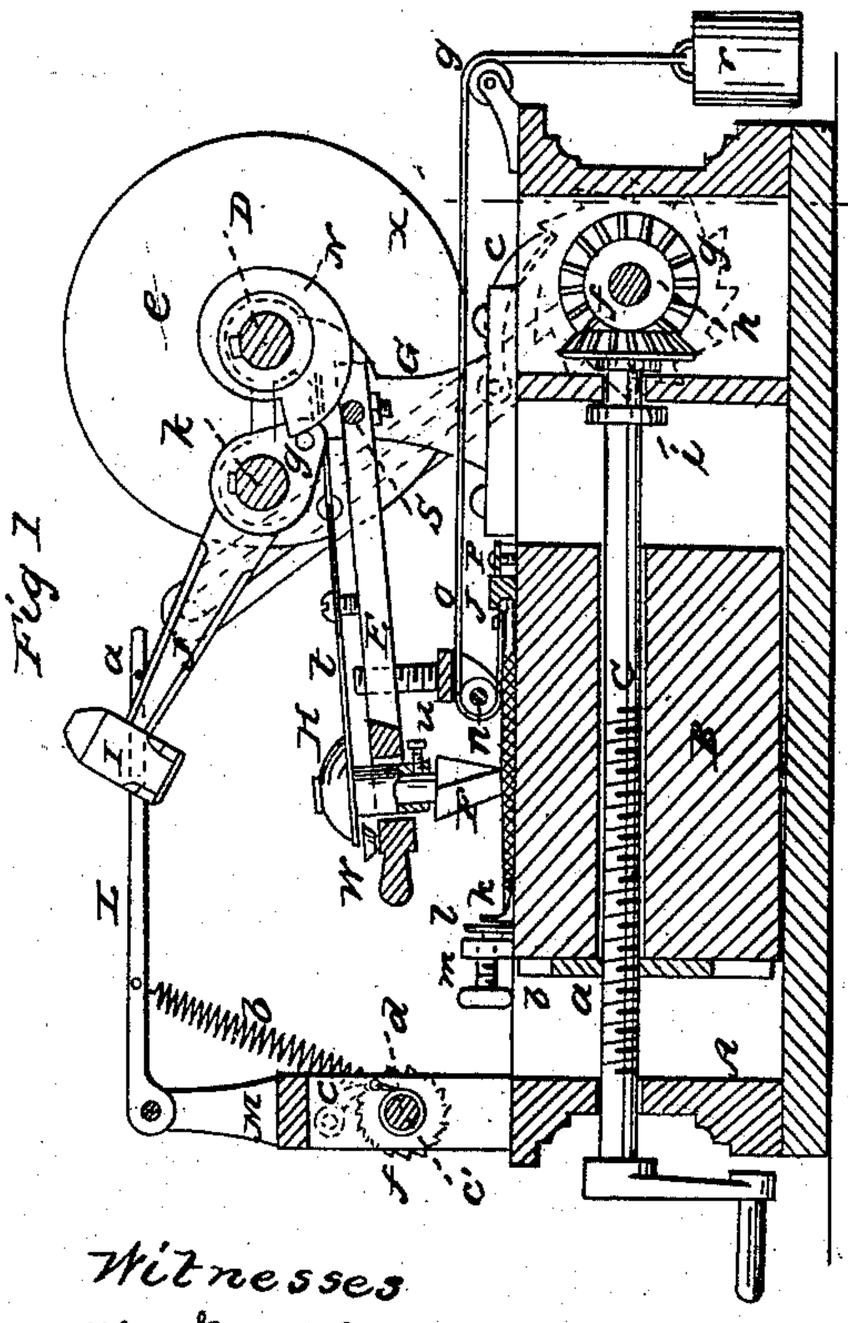


Fig. 3.

Fig 1



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UNITED STATES PATENT OFFICE.

JOHN ROTHERHAM AND JOSEPH HOLDEN, OF MIDDLETOWN, NEW YORK.

IMPROVED FILE-CUTTING MACHINE.

Specification forming part of Letters Patent No. **54,606,** dated May 8, 1866.

To all whom it may concern:

Be it known that we, J. ROTHERHAM and J. HOLDEN, of Middletown, in the county of Orange and State of New York, have invented a new and Improved File-Cutting Machine; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others 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 represents a longitudinal vertical section of this invention. Fig. 2 is a transverse vertical section of the same, the line *x x*, Fig. 1, indicating the plane of section. Fig. 3 is a plan or top view of the same, one of the hammers being broken away to expose the parts below.

Similar letters of reference indicate like parts.

This invention relates to a machine in which two files are cut at the same time. The blanks are secured, side by side, to the upper surface of an anvil or bed, which is fed automatically, after each stroke of the hammers, by means of a screw-spindle. The nut of this screw-spindle is cut in a vertically-adjustable slide, so that the bed or anvil is not affected by any inequalities in the feed-screw. Each blank is operated upon by a separate chisel, and these chisels are fastened in heads or holders which are suspended from flat springs secured to oscillating arms. These arms are provided with roller-feet, which bear down upon the surface of the bed or anvil while the chisels take action. By the action of springs which support the tool-holders the motion given to the chisels is similar to that given to them in cutting files by hand, said chisels being thrown back after each blow, so as to raise a burr. The hammers which are used to strike the chisels are secured to a rock-shaft, and they are operated by a cam on the driving-shaft. The force of the blows is regulated by a spring-bar, which bears on the handle of the hammer, and which is subjected to the action of a spring the tension of which can be increased or decreased at pleasure.

A represents a frame, made of iron or any other suitable material. The interior of this frame is planed out or otherwise arranged to receive the bed or anvil B, which is fitted in so as to move back and forth. At the same time this anvil rests upon the bottom of the frame A, thus producing a solid and firm bed for the file-blanks during the operation of cutting.

The requisite feed-motion is imparted to the bed or anvil B by a screw-spindle, C, which passes freely through the anvil and screws in a plate, *a*, held between dovetailed guides *b*, which are secured to the front end of the anvil. By this arrangement the anvil is rendered independent of the inequalities that may exist in the feed-screw, and it moves backward and forward without rising from the bottom of the frame A.

An intermittent rotary motion is imparted to the feed-screw C by the action of a lever-pawl, *c*, which is actuated by an eccentric wrist-pin, *d*, in a disk, *e*, which is mounted on the end of the main driving-shaft D. The lever-pawl *c* swings loosely on the end of a shaft, *f*, and said pawl gears in a ratchet-wheel, *g*, which is firmly keyed to the shaft, as shown in Fig. 2. A bevel-gear, *h i*, transmits the motion of the shaft *f* to the feed-screw. The eccentric wrist-pin *d* is adjustable in a slot in the disk *e*, and by moving it toward or from the center of said disk the feed-motion is decreased or increased at pleasure.

The blanks to be cut are secured on the surface of the anvil B by means of notched-studs *j*, which catch over the tail ends of the blanks, and by screw-clamps *k*, which catch over their points. The jaws of these screw-clamps are made V-shaped, so that they bite in the edges of the blanks and hold the same firmly down on the anvil. Said jaws are secured to a plate, *l*, which is guided by pins passing through lugs rising from the end of the anvil, and a screw, *m*, serves to force said jaws up against the tips of the blanks.

It is obvious that, instead of using a single screw for the purpose of operating both clamping-jaws, two independent screws might be used, one for each of the jaws, and we do not wish to confine ourselves in this respect to the precise arrangement shown in the drawings.

The blanks are held down upon the surface of the anvil or bed by means of roller-feet *n*, which are secured in arms E, and which bear down upon the blanks in close proximity to the chisels F. The rollers of said feet are pro-

tected by a belt or tape, *o*, so that their metallic surface does not come in contact with the surface of the file or blank after the first cut, and the injurious effect which would follow if the rollers should come in metallic contact with the newly-cut file is avoided.

The tapes or belts *o* are secured at one end to loops *p*, which are attached to the anvil or bed, and they extend from said loops round the rollers *n*, and thence over rollers *q*, which have their bearings in suitable lugs cast solid with or otherwise rigidly attached to the frame A. Weights *r*, suspended from the loose ends of the tapes or belts, produce the requisite strain.

The arms E are hung on a transverse bar, S, which has its bearings G rising from the frame A, and forming, also, the bearings for the main driving-shaft. Secured at their rear ends to the upper surfaces of the arms E, and extending throughout their entire length, or nearly so, are springs *t*, and to the loose front ends of these springs are attached the heads or tool-holders H, in which the chisels F are fastened. The shanks of the chisels are round, and they may be provided with a circular groove, and they are secured in position by a set-screw, *u*. By releasing the set-screws the chisels can be turned to any desired inclination, or they can be taken out and replaced by others with a broader or narrower cutting-edge. By having the chisels connected to the springs *t* their cutting-edges, on being depressed, describe circles, and when allowed to rise after a cut has been made they raise a burr precisely in the same manner as in hand-cutting. The height of the burrs thus produced can be increased or decreased by decreasing or increasing the effective length of the springs. If this length is decreased, the radius of the segment described by the cutting-edges of the circles is diminished and the burrs raised will be higher, and vice versa.

When the chisels are depressed the front ends of the springs or the shoulders of the tool-holders strike against screws or studs *w*, which are inserted in the front ends of the arms E. By means of these studs or screws the depth of the teeth can be regulated, said depth being diminished when the adjusting-screws are raised, and increased when the adjusting-screws are lowered or depressed.

In order to enable the chisels to accommodate themselves to the surfaces of the blanks, the arms E may be made in two parts, connected by a swivel-joint, which will permit the chisels to work in a lateral direction.

The blows on the chisels are struck by hammers I, the shanks or handles J of which are mounted on a rock-shaft, K, that has its bearings in the same standards which also form the bearings for the main driving-shaft.

The shanks J are subjected to the action of an arm, L, which is pivoted at one end to a standard, M, rising from the front end of the frame A, and the other end of which is provided with a cross-bar, *a'*, bearing on said shanks, as shown in Fig. 3. A spring, *b'*, draws said arm down, and the tension of this spring is regulated by a winding device of any desirable construction, such, for instance, as that shown in the drawing. This device consists of an arbor, *c'*, on which a cord, *d'*, winds, and the end of this cord is secured to the spring. A pawl, *e'*, catching in the teeth of a ratchet-wheel, *f'*, retains the arbor in any position into which it may be brought. By turning said arbor in the direction of the arrow marked on it in Fig. 1 the tension of the spring *b'*, and consequently the force of the blows struck by the hammers, is increased, and vice versa.

A suitable gage may be applied to indicate the tension of the spring.

The hammers I are raised by the action of a cam, N, on the driving-shaft, their shanks being provided with studs *g'*, on which said cam acts. The cam is so shaped that it raises the hammers to the desired height and allows them to drop, impelled by the action of the spring-arm L. One cam may thus be made to raise simultaneously both hammers; but, if desired, separate cams might be employed, one for each hammer.

By this machine two files of any desirable size can be cut simultaneously, the blows and the depth of the teeth can be regulated to the thickness of the files of that portion of the files on which the chisels act, and each chisel is free to accommodate itself at any moment to the surface of the file on which it acts, independent of the other chisel.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. Giving to the chisel F a backward motion in imitation to the hand-cut by means substantially such as herein described, for the purpose set forth.

2. The swiveled roller *n*, applied in combination with the arms E, chisels F, and anvil B, all constructed and arranged substantially as and for the purpose set forth.

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