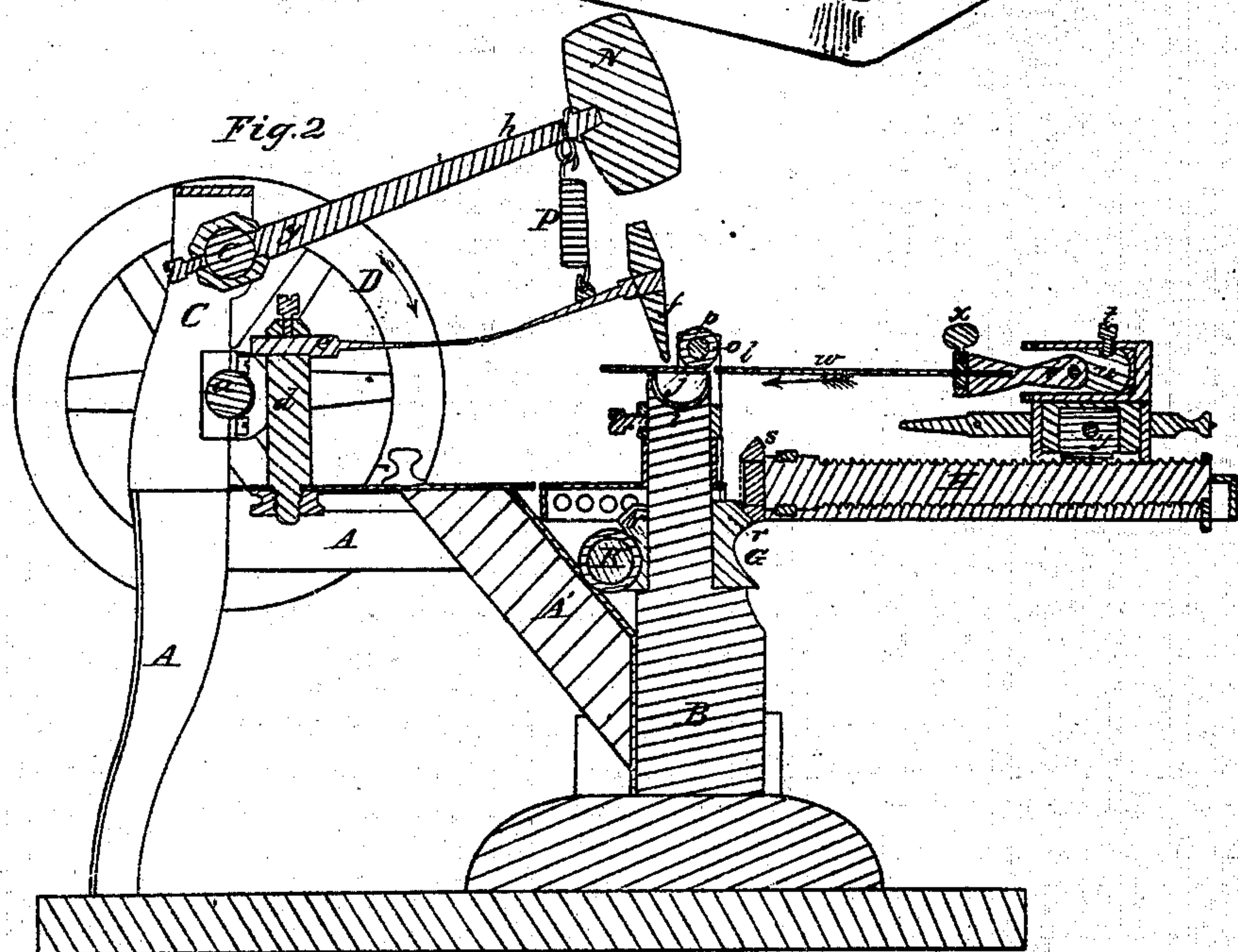
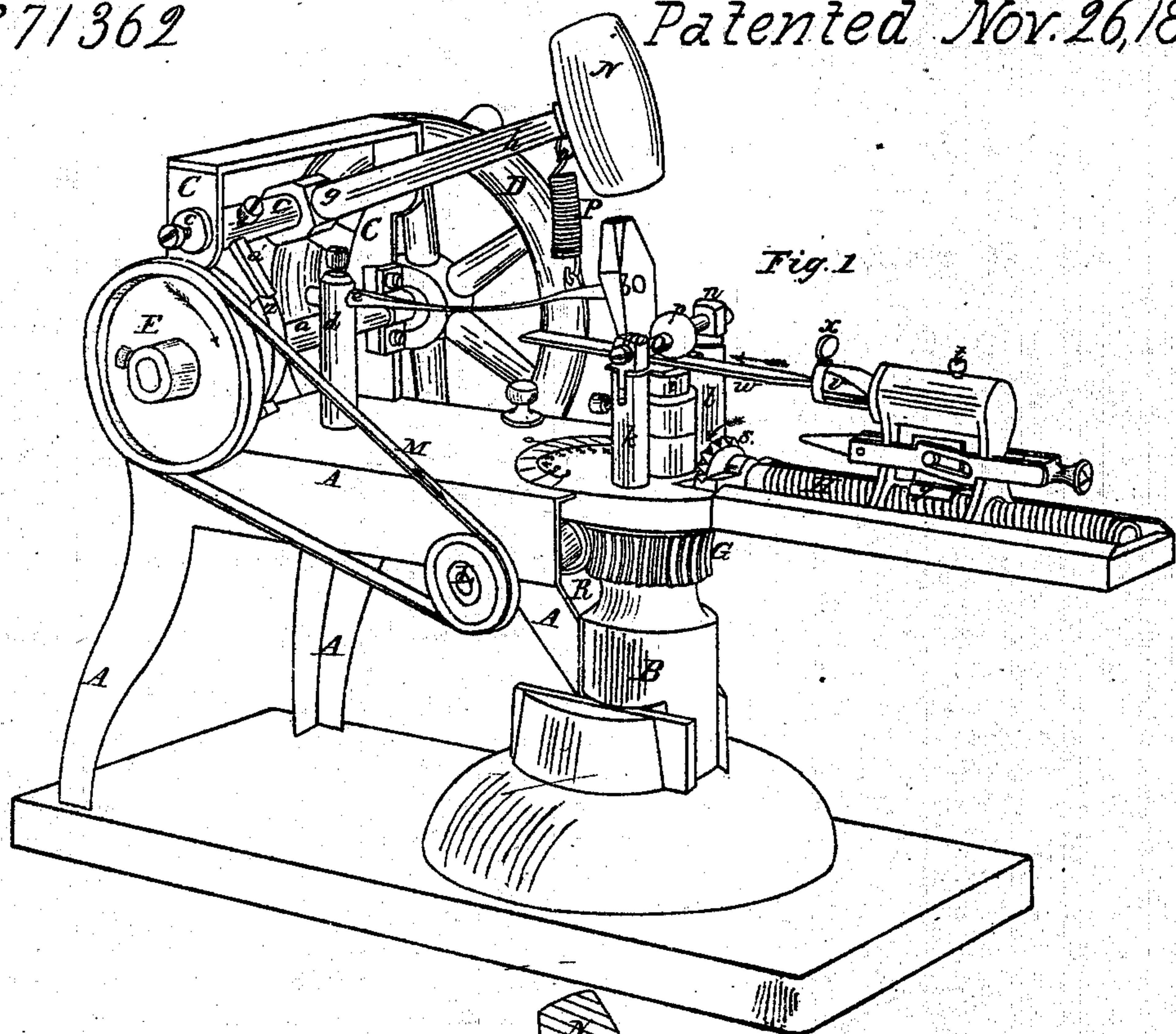


Card & Studley.

File Cutter.

Nº 71362

Patented Nov. 26, 1867.



Witnesses
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Letters Patent No. 71,362, dated November 26, 1867.

IMPROVED FILE-CUTTER.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that we, GEORGE F. CARD and CHARLES A. STUDLEY, both of the city of Bridgeport, in the county of Fairfield, and State of Connecticut, have invented a new and useful Improvement in Machinery for Cutting Files; and we do hereby declare that the following is a full, clear, and exact description of the construction, character, and operation of the same, reference being had to the accompanying drawings, which make part of this specification, in which—

Figure 1 is a perspective view of the whole machine, as ready for use, with the blank in its position for being cut.

Figure 2 is a longitudinal section of the machine, cut vertically through the centre, showing the relative positions of the several operating parts.

Our improvement consists in the manner, hereinafter described, of arranging the feed so that it may, by a universal motion, allow the blank always to rest true and firm on the anvil or block, at a point directly under the edge of the chisel, however much the blank may taper or differ in thickness, either longitudinally or in cross-section, or be in any small degree winding or warped, as it will conform to any such variations; and in the hereinafter-described manner of operating the chisel and hammer so that the chisel, after being raised or carried over the tooth or burr last raised, may come down, and, by its pressure, force the portion of the blank next to be cut to the proper position and firmness before the hammer strikes the chisel, so that the cut will be of equal depth from side to side; and in the manner, hereinafter described, of arranging and operating the turn-table, in connection with apparatus, so that we are able to cut or form the teeth of the file at any desired angle or degree of obliquity, while the feed will continue the same, without reference to the position of the turn-table.

We make the frame A A A and A' of cast iron, or any other suitable material, substantially in the form shown in fig. 1, and indicated in fig. 2; and we attach it to the stock or lower part B of the anvil or stake by means of the brace A'; and on the rear portion, or at the end of this frame, we erect or attach two posts or uprights, C C, as represented in fig. 1, (one of which is shown in section in fig. 2,) in which we have the bearings for the journals of the shaft *a*, of the fly-wheel D, cam *z*, and driving-pulley E, and also the bearings, as *b* of the hammer-shaft *c*, all as shown in fig. 1, and indicated in fig. 2.

In front of the shafts *a* and *c* we erect a stud or upright, as shown at *d*, into the upper part of which we insert the end of the elastic handle or bar which carries (at the other end) the cutting-chisel *f*, the edge of which chisel may be made of any shape to fit the upper surface of the blank, whether straight or curved; and we secure the rear end *g* of the hammer-handle *h* to the shaft *c*, all as represented in fig. 1, and indicated in section in fig. 2, making the hammer *n* of the desired size.

We make the stock or lower part B of the anvil or stake of cast iron, or any other suitable material, and the upper part of steel, if deemed necessary; and in the extreme upper end we make a hemispherical cavity, as represented in section at *i*, fig. 2, to receive a steel solid hemisphere, *j*, in such a manner as to form, to a limited extent, a ball-and-socket joint; and we make a suitable recess or space across this flat top, to receive the file-blank and hold it steady while being cut; and we fit two hollow cylinders, *k* and *l*, one on each side, but a little in front, of the upper end of the anvil, in each of which we fit a piston or plunger, the upper ends of which are shown at *m* and *n*, and they are drawn downward by spiral springs, or any other analogous means; and in the upper ends, *m* and *n*, we fit suitable bearing for the arbor or axis *o* of the ball *p*, which is revolved by the friction of the feed, and holds the blank steady in the required position while being cut. We make this ball *p* of copper, or any other suitable material that will not injure the points or edges of the teeth while passing over them in the cross or second cutting of the file.

On the central portion of the stock of the anvil or stake we drop (loosely) a toothed wheel, with a concave periphery, as represented at G, fig. 1, and indicated in fig. 2, which is revolved by the worm K; and the upper end of the wheel G we cut as a bevel-gear, as indicated in section at *r r*, fig. 2, which works the bevel-gear pinion *s* on the end of the feeding-screw H, all as represented in fig. 1, and indicated in fig. 2. The worm K may be worked by pulleys L and E, and band M, or by a suitable train of gear-wheels.

We make the universal joint, to hold the file-blank, substantially as shown in section in fig. 2, where the point of the screw *t* holds the block or plug *u* in its position, but allows it to revolve as far as is necessary, while the part *v* works on a joint-pin and in a slot, so that the revolving motion of one and rectilinear motion of the other will constitute the universal motion; and we secure the end or tang of the blank *w* in the part *v* by means of the binding-screw *x*. And to cause the parts *u* and *v* to advance in the direction indicated by the dart, to feed the blank, we attach to the under side of the cylinder in which they work a segment of a nut, *y*, to fit the feeding-screw *H*, which we throw into and out of gear by means of a pin or projection, which works in a diagonal slot, as shown in fig. 1.

Having constructed and arranged the several parts as before described, we secure the tang of the file-blank in the part *v* by the screw *x*, and pass the point of the blank into the recess or cavity in the upper surface of the solid hemisphere *j*, and under the ball *p*, to the proper extent to allow the chisel *f* to fall at the point where we desire to commence the cutting, adjust the turn-table, by its graduations, to the angle or degree of obliquity at which we wish to have the teeth, and then set the machine in operation by applying power to the driving-pulley *E*, (or in any other convenient way,) when the cam *z*, acting on the tail *a'*, will raise the hammer *n* to the position shown in figs. 1 and 2, and the spiral spring *P* will raise the chisel *f* sufficiently to pass over the last tooth or burr raised by cutting, so as to allow the blank to be fed forward, when the rounded surface of the tail *a'* of the hammer *N*, (or of the cam *z*,) the edge of the chisel *f* will again come down so as to press the blank to its proper position, when the hammer *N* will fall on the upper end of the chisel *f*, and produce the cut or raise the tooth, and so on till the side is cut as far as desired; and then the other side may be cut in the same way; and each of the sides may be cut again, making the latter cuts across the former at any desired angle.

Among the peculiar advantages of our improvement is the manner of arranging the ball-and-socket joint, and the universal motion, so that the surface of the blank may always be presented fairly to the edge of the chisel, irrespective of any difference of thickness in the blank, either lengthwise or crosswise, or any twisting of the blank; and in the method of holding the blank in its place by the pressure of the yielding spherical ball of soft metal, so that the pressure may conform to the varying thicknesses of the blank in either direction, and to any winding.

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

1. The combination of the ball-and-socket joint (*j* and *i*) with the universal-motion apparatus, (*u* and *v*), when they are constructed, combined, and fitted to feed and to adjust the blank, substantially as herein described and set forth.
2. We claim the combination of the hammer *N*, chisel *f*, and spring *P*, when they are constructed, connected, and fitted to produce the result, substantially as herein described and set forth.
3. We claim the combination of the worm *K* and wheel *G* and *rr* with the pinion *s*, screw *H*, and segmental nut *y*, when they are constructed, combined, and fitted to feed the blank, substantially as herein described and set forth.
4. We claim the combination of the turn-table with the feeding and blank-holding apparatus herein described, when constructed and fitted to govern the cut, substantially as herein set forth.
5. We claim the combination of the turn-table and holding-device with the anvil *j* and ball *p*, and its appendages, when they are constructed, combined, and fitted for use, substantially as herein described and set forth.

GEORGE F. CARD,
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Witnesses:

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THEODORE COLSTAN.