(No Model.)

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FILE CUTTING MACHINE.

No. 509,949. Patented Dec. 5, 1893.

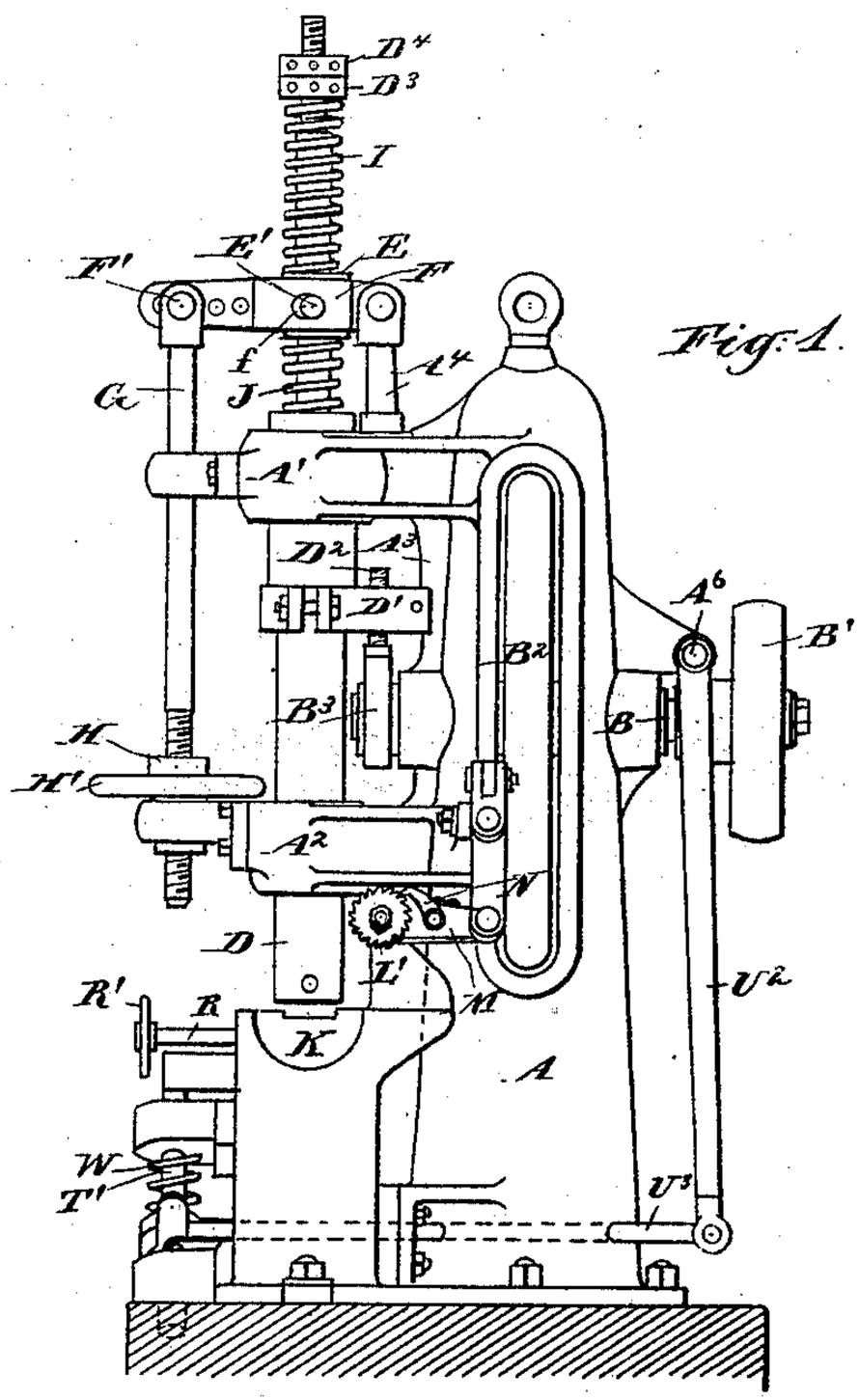

Fig. 1.

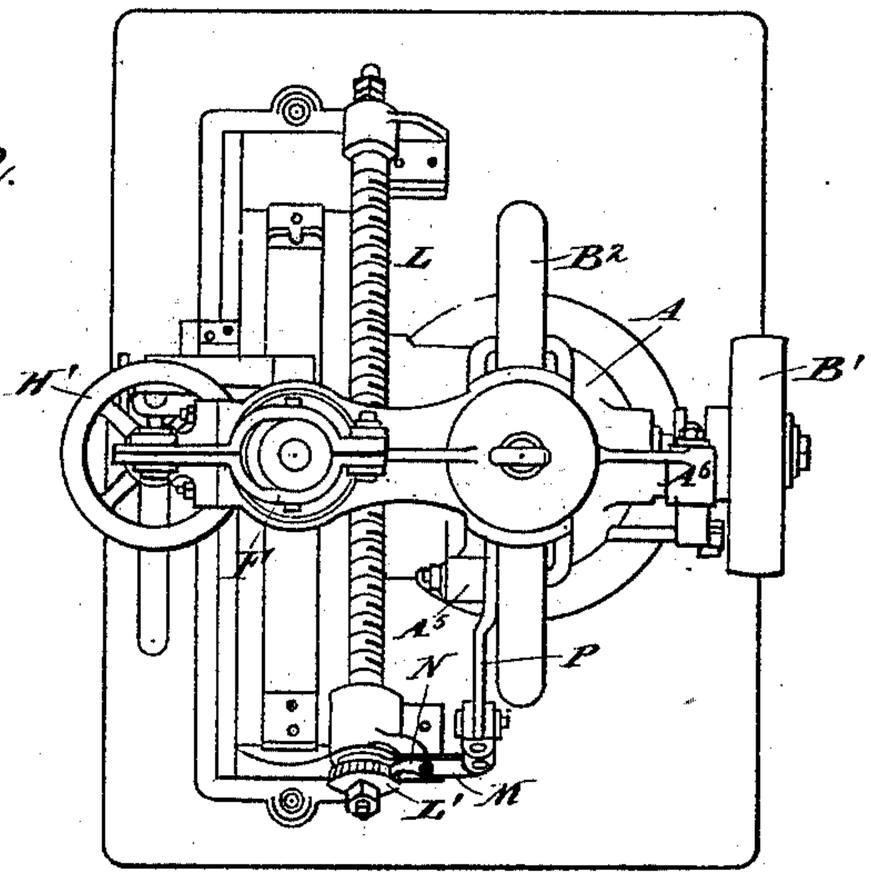

Fig. 2.

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Fig: 3.

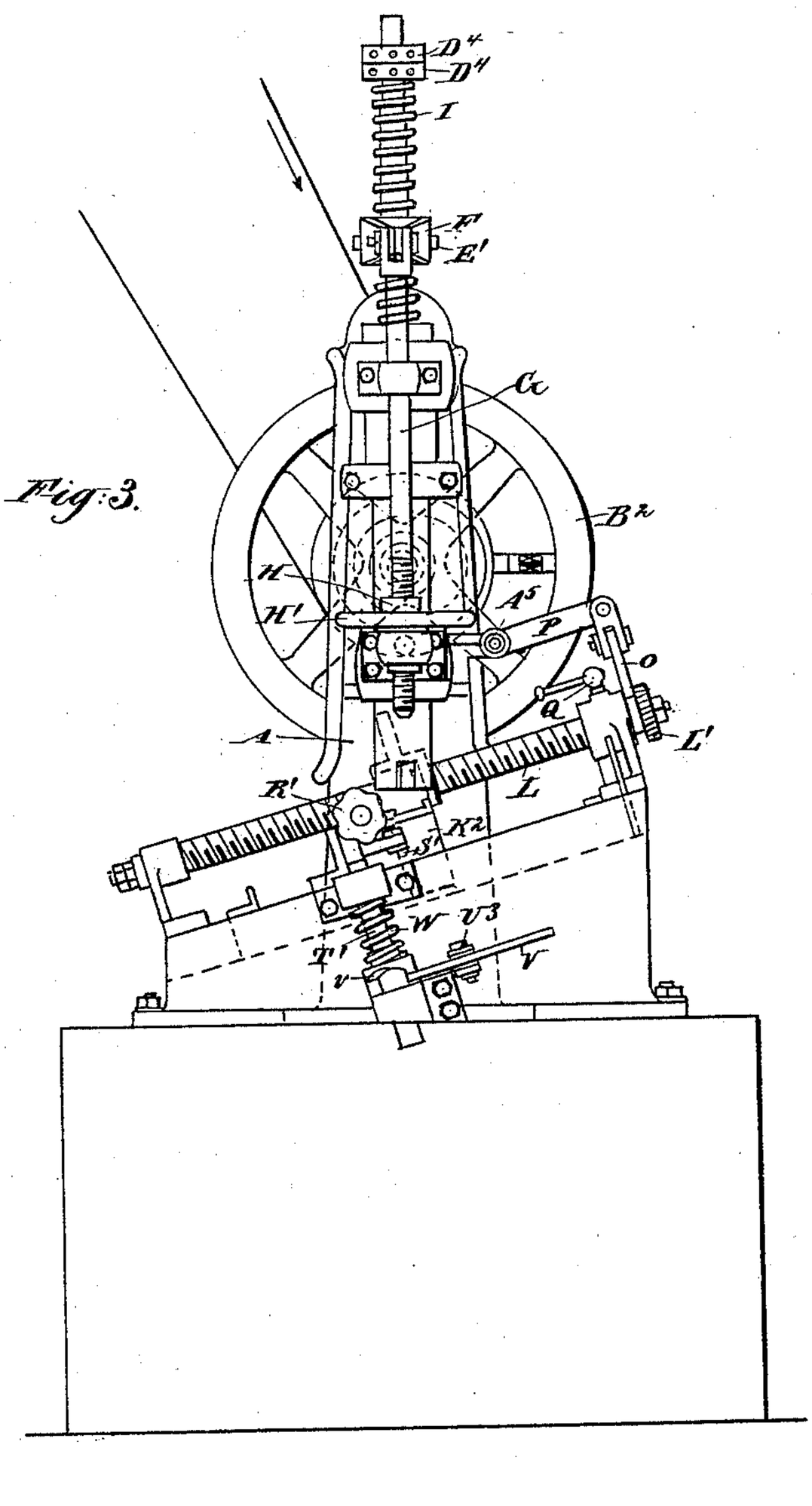

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Fig: 4.

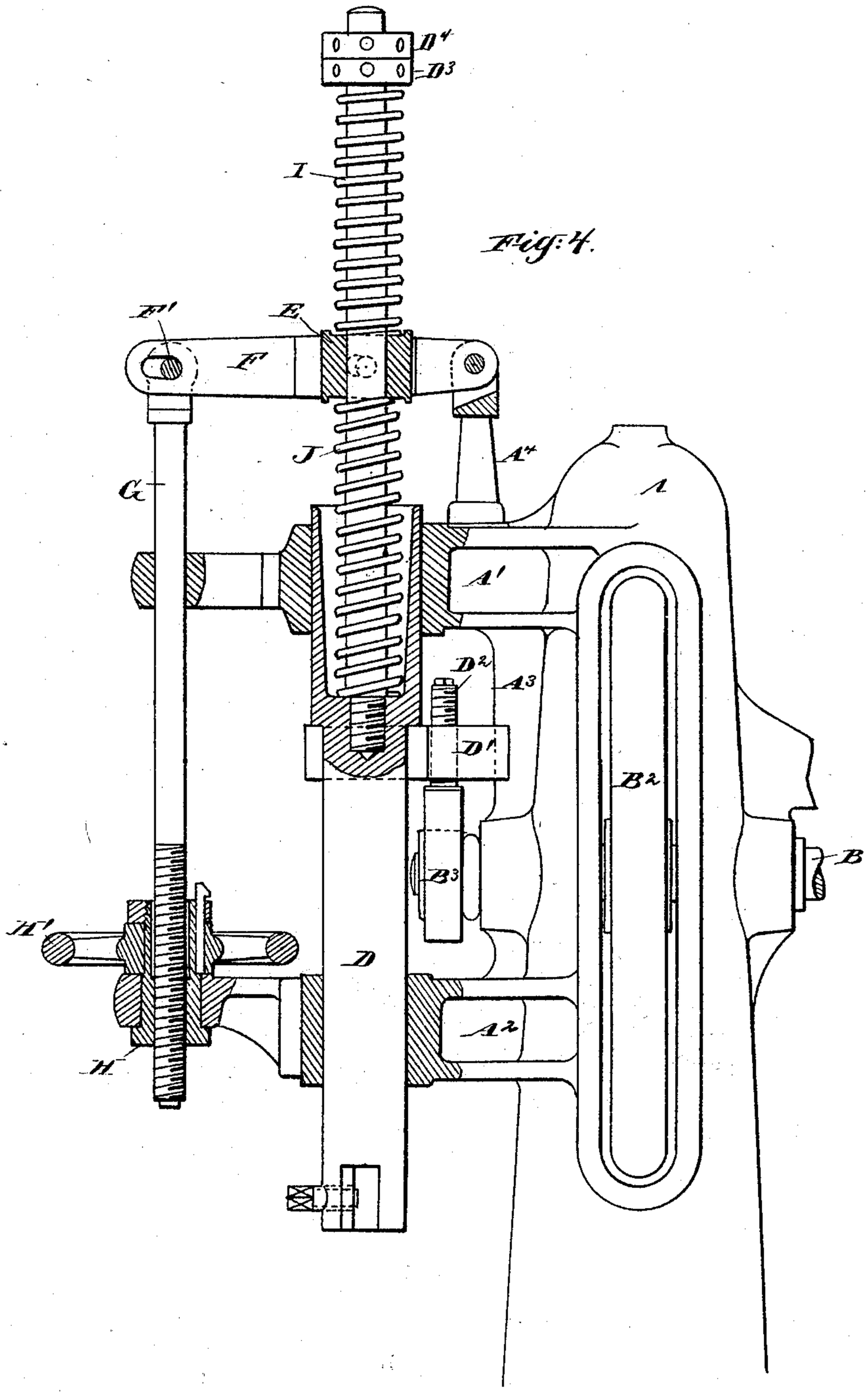

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Fig: 5.

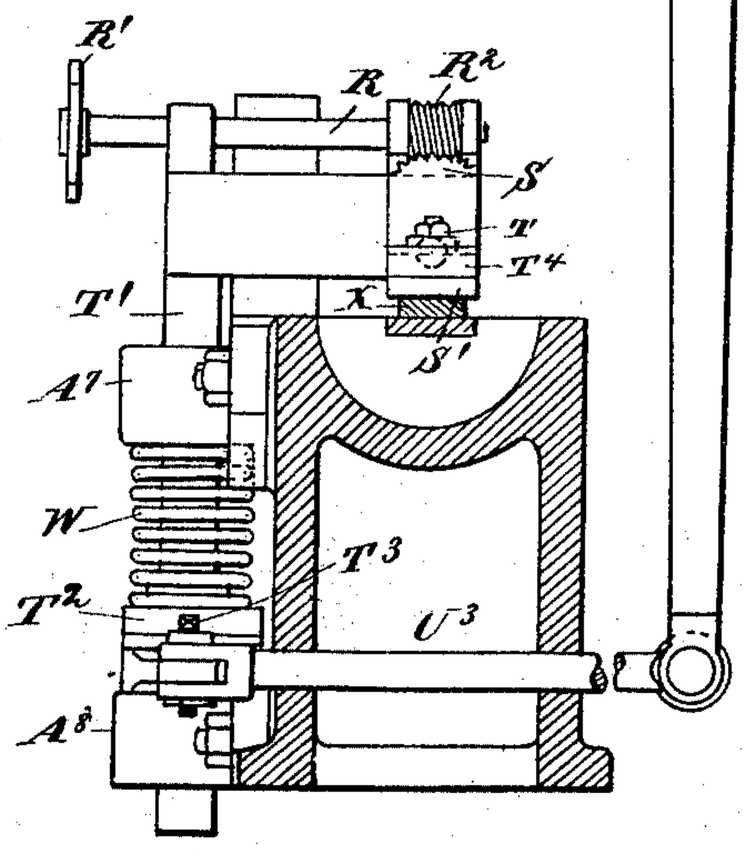

Fig: 6.

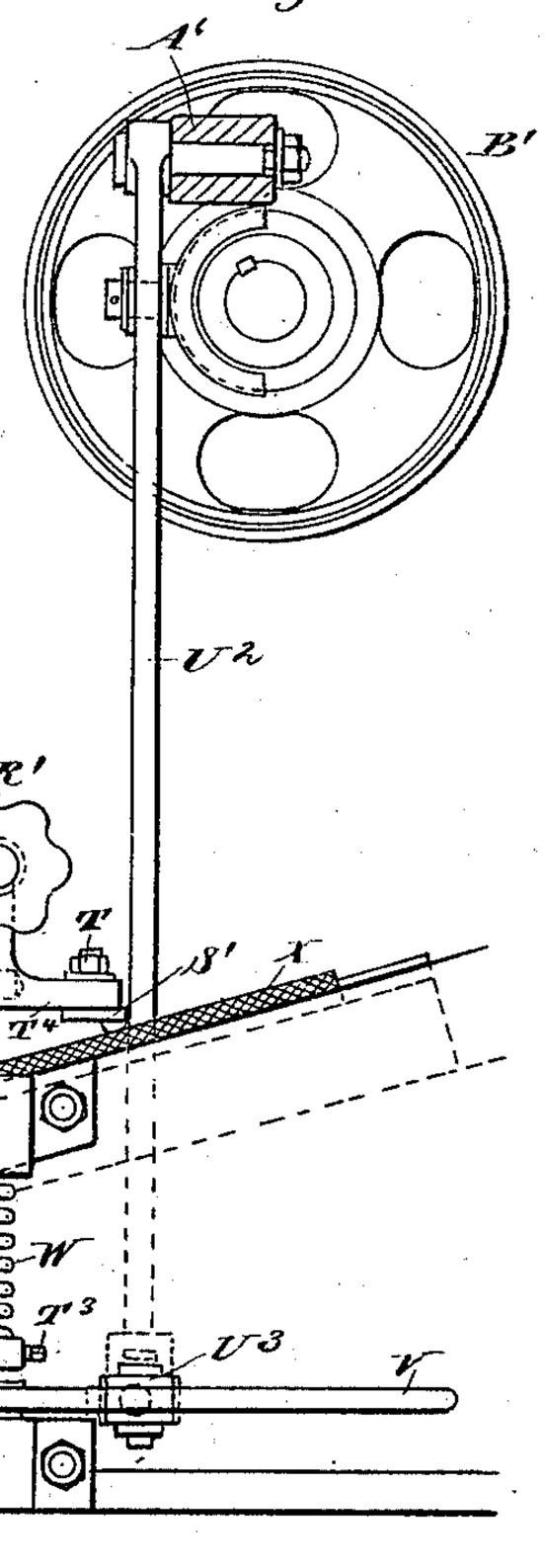

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Fig: 9.

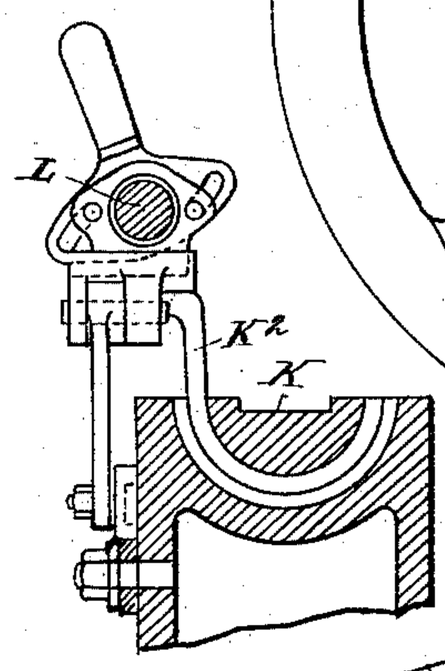
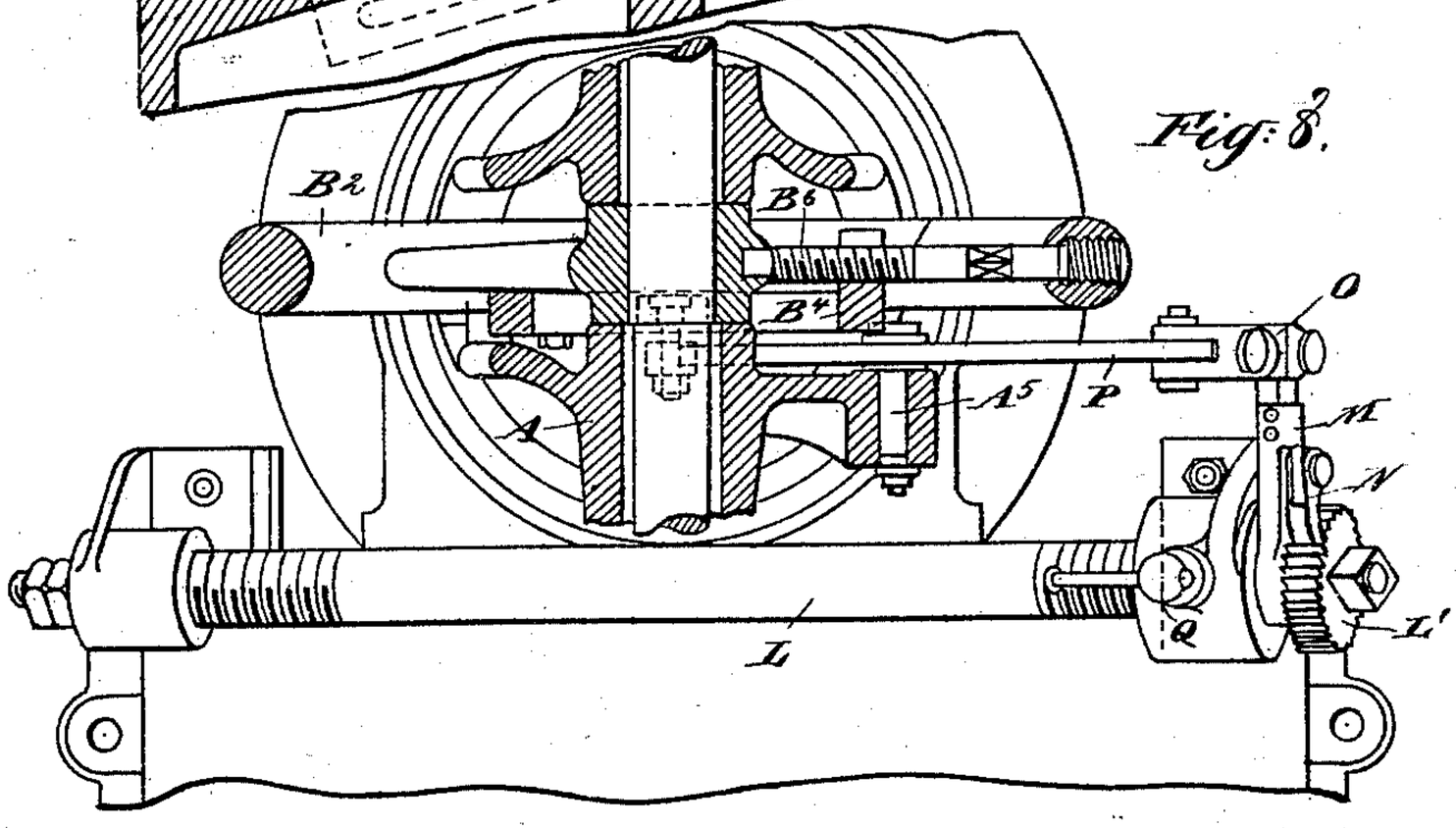


Fig: 7.

Fig: 8.



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UNITED STATES PATENT OFFICE.

GUSTAV SCHMIDT, OF AMMENDORF-RADEWELL, GERMANY, ASSIGNOR TO FRIEDRICH SCHMIDT, OF BROOKLYN, NEW YORK.

FILE-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 509,949, dated December 5, 1893.

Application filed November 10, 1892. Serial No. 451,511. (No model.)

To all whom it may concern:

Be it known that I, GUSTAV SCHMIDT, a subject of the Emperor of Germany, residing at Ammendorf-Radewell, near Halle-on-the-Saale, Saxony, in the Empire of Germany, have invented a certain new and useful Improvement in File-Cutting Machines, of which the following is a specification.

I vary the feed, and consequently the distance between the several teeth, by employing an adjustable eccentric with means for readily controlling it. I have devised an arrangement of springs and lever, and provisions for conveniently adjusting the latter whereby to vary the force of the blow. I clamp and release the file by the same movement which starts and stops the machine. I employ an arrangement of the mechanism which brings the crank and its connecting link close to the hammer-bar.

The accompanying drawings form a part of this specification and represent what I consider the best means of carrying out the invention.

Figure 1 is a side elevation; Fig. 2 a plan view, and Fig. 3 an end elevation. These views all show the machine with one chisel or file in place. The remaining figures represent portions on a larger scale. Fig. 4 is a view corresponding to Fig. 1, but with certain portions in section. Fig. 5 is a vertical section in the plane of the axis of the main shaft. Fig. 6 is an elevation as seen at right angles to the view in Fig. 5. Figs. 5 and 6 show a file in position. These figures show a slight modification in having the clamping bar vertical instead of inclined. Fig. 7 is an elevation corresponding to Fig. 3 but partly in section. Fig. 8 is a plan view partly in horizontal section on the plane of the axis of the main shaft. Fig. 9 is a vertical section on the line 9—9 in Fig. 7.

Similar letters of reference indicate corresponding parts in all the figures where they appear.

A is a stand of cast iron. B is a shaft supported in fixed bearings in this stand, and rotated by a belt running on the pulley B′, and steadied by a fly-wheel B^2 which revolves in an aperture in the stand.

B^3 is a cam carried on the shaft, adapted to lift the hammer and to leave it free to fall at regular short intervals.

D is the hammer-bar, mounted in bearings formed in fixed arms A′, A^2, cast on the stand A. An arm D′, firmly secured in an adjustable position on this bearing, extends longitudinally toward and is guided by a slide-way A^3 on the stand. The cam acts on this arm D′ through a screw D^2 which allows of fine adjustment. The arrangement allows the cam to act very closely to the central line of the hammer-bar.

The upper portion of the hammer-bar D is of less diameter and plays easily through a hole in a block E, which is provided with horizontal trunnions E′, E′, engaged in slots *f* in a hollow lever F. One end of this lever is pivoted in a fixed post A^4; the other end is connected by a pin F′ to a rod G which is tapped through a nut H, free to revolve in an extension of the arm A^2, and may be turned by a hand-wheel H′. At a higher point this rod G is guided in an extension of the arm A′.

The hammer-bar D extends above the block E, and is provided with a nut D^3 and a jam-nut D^4, and receives a lifting force from the coiled spring I which abuts on the upper face of the block E. Another spring J abuts against the under face of the block E and extends down into a pocket provided in the hammer-bar, exerting a force to depress the latter. The springs exert their force in opposition to each other with the tendency to hold the hammer-bar at a certain level, and to traverse above and below that position with prompt returns. The height of the block E, and consequently of the position at which the hammer-bar seeks to come to rest, may be raised and lowered by turning the hand-wheel H′. The operator can by this means vary the force of the blow in either direction, and as often as required during the progress of the work.

K is the anvil or carriage, having a semi-cylindrical lower face, mounted in an inclined channel of corresponding cross-section. The anvil is traversed by a screw L, provided with a ratchet-wheel L′ which is revolved step by step, and is connected with the anvil through a split nut K′ and yoke K^2, which latter is fitted in a transverse groove in the lower side of the anvil. The screw is turned a little at

each lifting motion of the hammer-bar. The extent to which it is turned, and consequently the extent to which the anvil and the file X carried thereon are moved between each cut, can be varied, as follows:—

A lever M is loosely mounted on the screw L, and is provided with a spring pawl N which engages in the teeth of the ratchet. This arm is connected by a link O with the lever P turning on the center A^5 carried on a fixed portion of the stand A. The other extremity of the lever P bears by a roller P′ against an adjustable eccentric cam which is in two parts, one part firmly bolted to the wheel B^2, and the other part, B^4, adjustably connected by holding bolts B^5 and an endless adjusting screw B^6, which latter is mounted in the wheel B^2. By turning this screw and varying the position of the part B^4, I can vary the throw of the cam within wide limits. The form of the cam is approximately eccentric, and the provisions for actuating the lever P may be designated as an adjustable eccentric. When it is desired to turn the screw L so as to make the file coarser, the screw B^6 should be turned in the direction to increase the throw of the eccentric. When it is desired to make the file finer, by putting the cuts nearer together, the screw B^6 is turned to reduce the throw of the eccentric B^4.

Q is a screw which is mounted in one of the bearings, and can be employed to resist the turning of the screw L with any required degree of force to avoid its ever turning backward.

So soon as the cutting of one face of a file is completed the machine is stopped and the blank is unclamped and taken out and turned over, and the anvil carrying the file being returned again to its starting position the work is again resumed. The frequent startings and stoppings are effected by means of a friction-clutch engaged in one side of the pulley B′. When this clutch is relaxed, the pulley B′ turns idly and the machine is stopped.

R is a shaft operated by a hand-wheel R′, having a scalloped periphery to facilitate grasping and turning it, and carrying an endless screw R^2, which latter engages in a worm-segment S, carrying a clamp S′ adapted to be partially revolved on the bolt T on which it is mounted. The entire bolt T with its clamp S′ is raised and lowered in the act of starting and stopping the machine, it being lowered to clamp the file by the same motion which starts the machine, and being raised to liberate the file by the reverse motion.

U is a frustum of a cone feathered on the shaft B so that it is compelled to turn therewith, but may be moved endwise. It is engaged by a half-ring U′, fitting in a groove extended around and trunnioned in a lever U^2, turning on a fixed center at A^6. The lower end of this lever is connected by a link U^3 to a lever V which turns freely on the upright or nearly upright cylindrical bolt or slide T′. This bolt is guided in fixed bearings A^7 and A^8, and is capable of rising and sinking. It is depressed by a spiral spring W abutting against the upper bearing A^7, and pressing downward on a collar T^2 which is secured on the bolt T by pinching-screws T^3. The under side of this collar has a cavity or recess *t* which nearly coincides in form with the cam V′, but it is a little longer. The lever V may be turned in one direction and the other, simply moving its cam V′ in the cavity *t* without raising the bolt T′, but when this lever is fully turned in the direction to disengage the friction-clutch U and cause the machine to stop, the cam V′ is moved out of the recess *t*, and by acting under the plane lower face of the collar T^2 will lift the bolt T′ in opposition to the force of the spring W. The arm T^4 carries a clamping surface S′ which is adapted to press on the file-blank X and hold it firmly. When the machine is working, the lever V is in such position that the cam V′ is received in the recess *t* and the clamp S′ presses on the file-blank with the full force of the spring W. To stop the machine the operator turns the lever V, and the single movement acts through the lever U^2 and disengages the clutch U, and also acts by its cam V′ to lift the bolt T, and consequently the clamp S′ and liberate the file-blank X.

The engagement of the anvil K with the two-part nut K′, which traverses it step by step longitudinally, is effected through an arm or yoke K^2, which is curved, as clearly shown in Fig. 9, and engages in a transverse groove extended around the anvil so as to compel the anvil to travel longitudinally with the arm and the divided nut but to allow the anvil to be partly rotated on its axis. Such rotation may be effected by the attendant at will, and is especially important in cutting round and what are known as "half-round" files, allowing the blank to be presented so as to receive the cuts at any angle required in the several traverses of the blank through the machine. It is also useful in cutting the flat faces of files by allowing the depth of cut across the face to be increased on one edge and diminished on the other at will. This may be controlled by changing the position of the clamp S′ so as to aid in holding the file very exactly in the position required. The clamp is capable of partially revolving on the horizontal pivot T^5 and has a segment S on its upper side which is engaged by an endless screw R^2, controlled by the hand-wheel R′, by turning which latter the angle at which the clamp will press on the file may be varied and the file and anvil correspondingly held so as to insure a uniform cut across the file.

I claim as my invention—

1. In a file-cutting machine the changeable cam B^4, and adjusting screw B^6 carried on the shaft B, in combination with connections as a lever P, link O, lever M, pawl N and screw L, for feeding forward the carriage K,

and with means as the clamp T′ for firmly holding the file blank on such carriage, and with the hammer-bar D carrying a suitable cutter, and with operating means therefor, all arranged for joint operation substantially as herein specified.

2. In a file-cutting machine, the two springs I and J, in combination with each other, and with the block E and hammer-bar D, and with means for operating the latter, to varying extents all arranged for joint operation substantially as herein specified.

3. In a file-cutting machine, the two springs I and J, in combination with each other and with the hammer-bar D, lever F, block E trunnioned thereon, rod G and nut H with its hand-wheel H′, all arranged for joint operation substantially as herein specified.

4. In a file-cutting machine, the lever V, carrying the cam V′ and clamp S′ operated by said cam, in combination with the connection U^3 to the lever U^2 operating a friction-clutch U for starting and stopping the machine, all arranged for joint operation substantially as herein specified.

5. In a file-cutting machine, the anvil K, capable of being partially revolved at will, and provisions for feeding it forward as required to graduate cuts, in combination with the yoke K^2 carried by the feed-screw L, and with the clamp S′ and provisions as the hand-wheel R′, screw R^2 and worm segment S for changing the inclination of the clamp at will, all arranged for joint operation substantially as herein specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GUSTAV SCHMIDT.

Witnesses:

CARL BORNGRAEBER,

GUSTAV ZIEROLD.