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PATENTED NOV. 14, 1905.

C. M. HENDERSON.
SAW FILING MACHINE.
APPLICATION FILED MAR. 9, 1905.

2 SHEETS—SHEET 1.

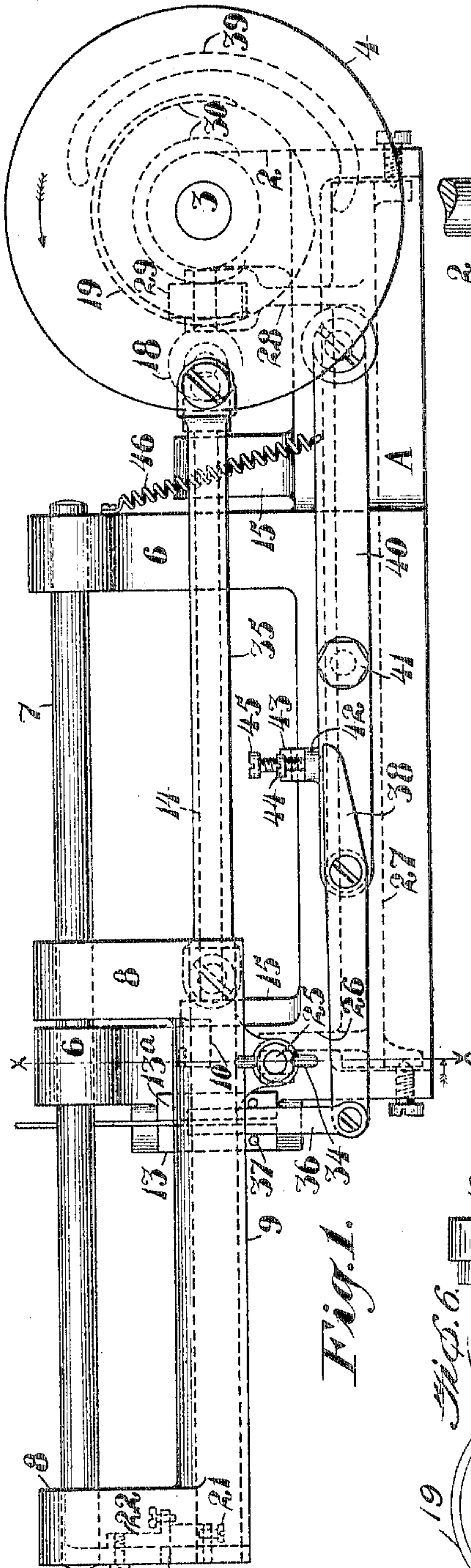


Fig. 1.

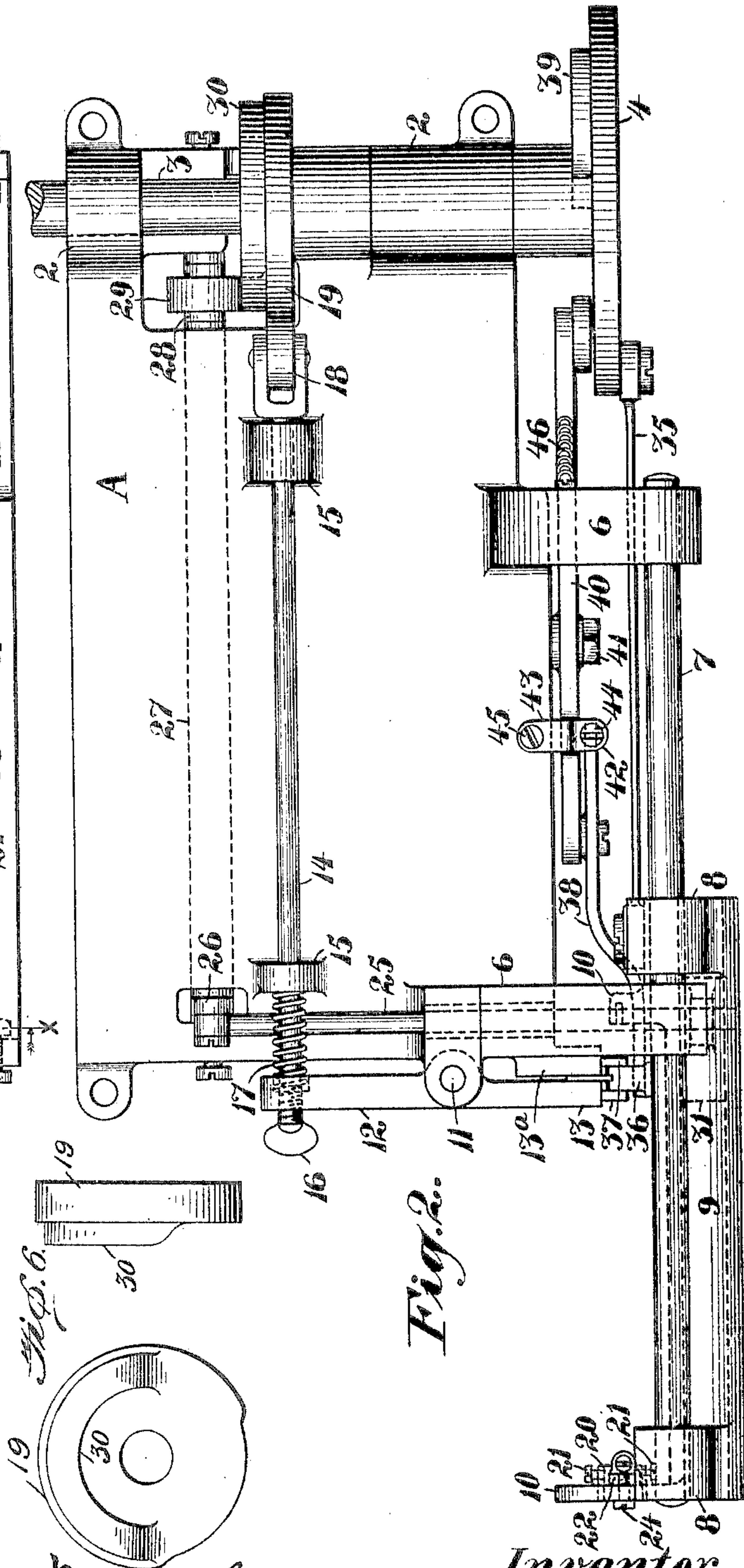


Fig. 2.

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2 SHEETS—SHEET 2.

Fig. 3.

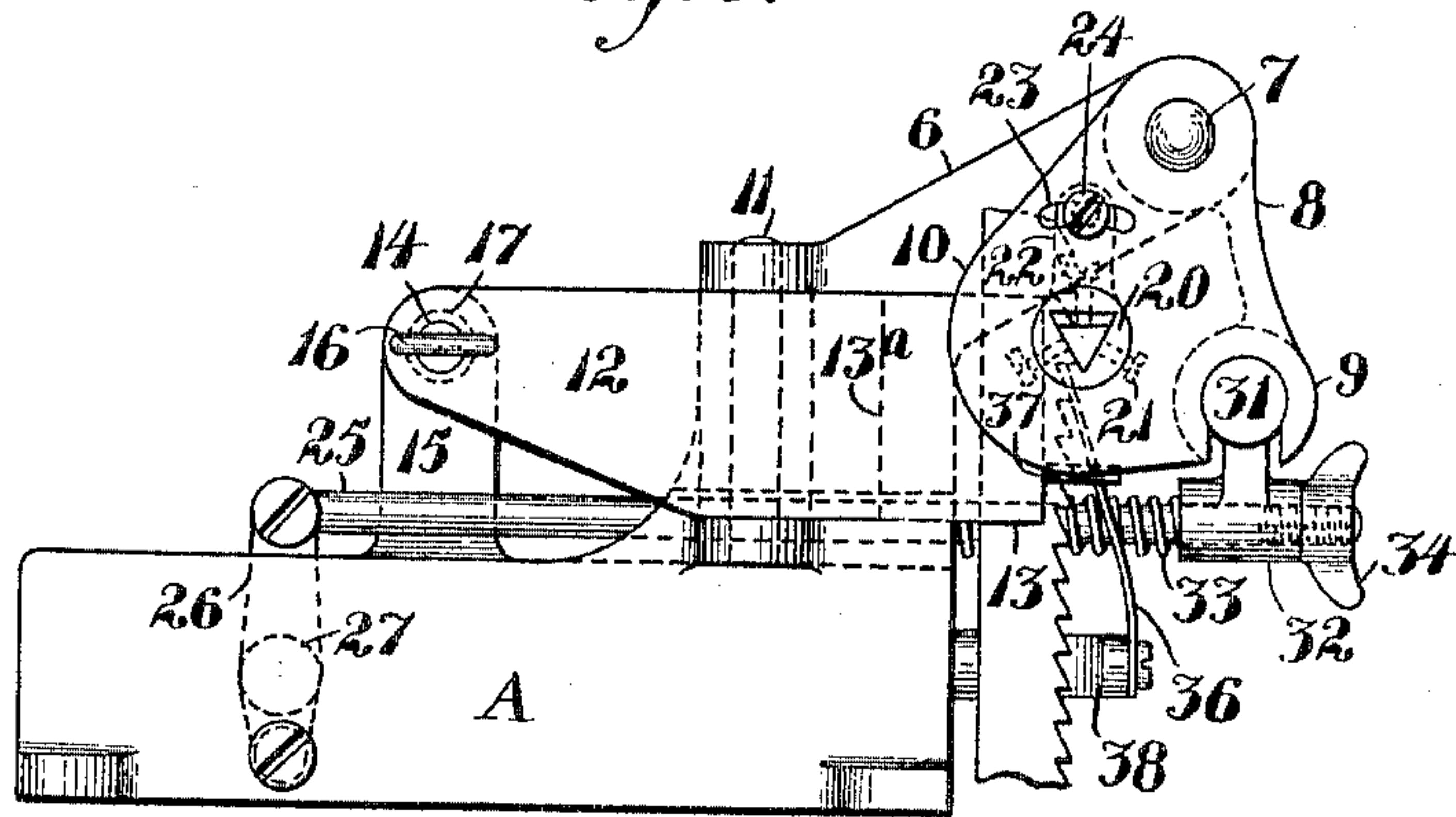
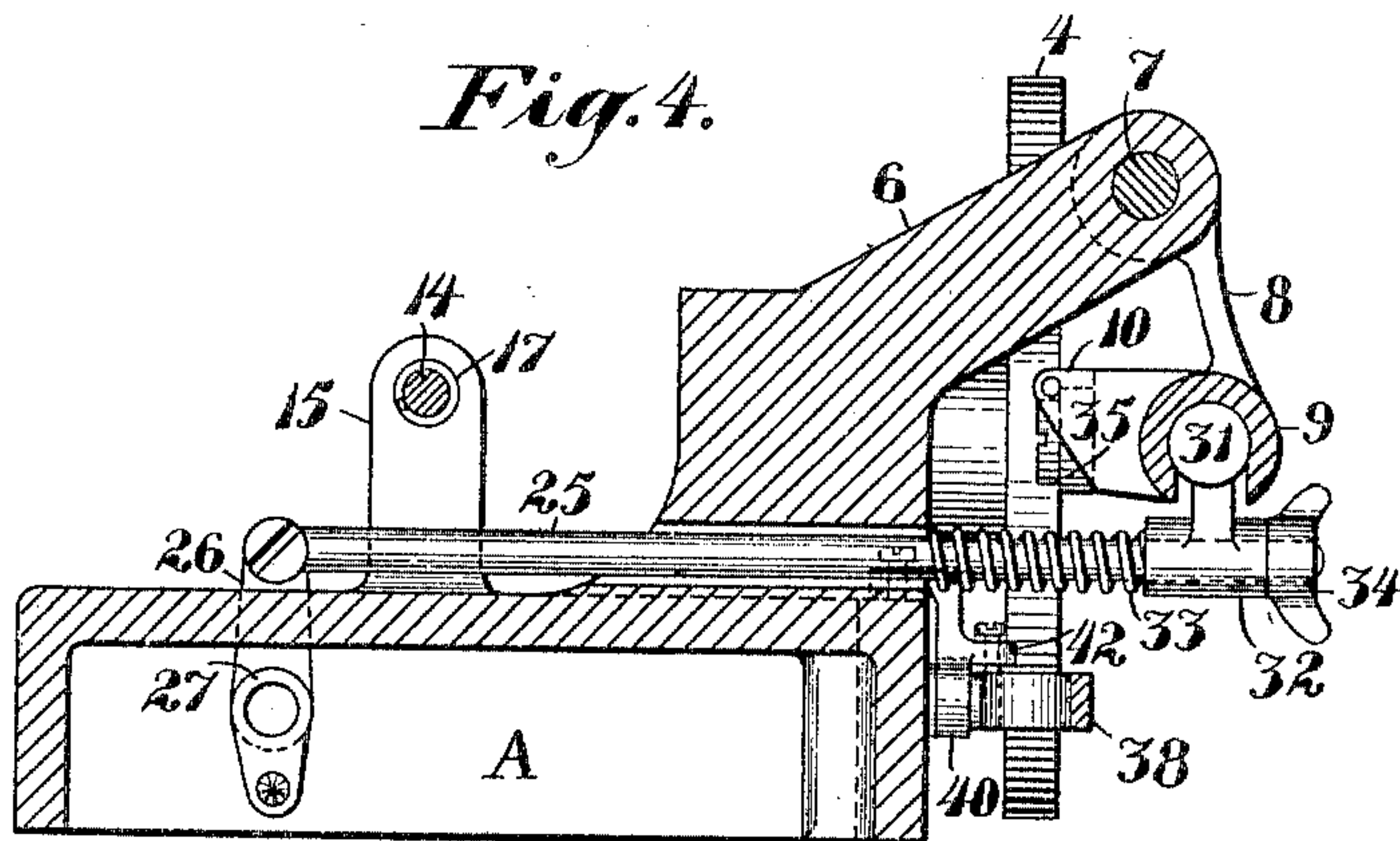


Fig. 4.



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UNITED STATES PATENT OFFICE.

CLARENCE M. HENDERSON, OF BERKELEY, CALIFORNIA.

SAW-FILING MACHINE.

No. 804,534.

Specification of Letters Patent.

Patented Nov. 14, 1905.

Application filed March 9, 1905. Serial No. 249,234.

To all whom it may concern:

Be it known that I, CLARENCE M. HENDERSON, a citizen of the United States, residing at Berkeley, in the county of Alameda and State of California, have invented new and useful Improvements in Saw-Filing Machines, of which the following is a specification.

My invention relates to improvements in apparatus for filing saws, and is especially designed for filing endless band-saws.

It consists in combinations of mechanism and in details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of my apparatus. Fig. 2 is a plan view of same. Fig. 3 is an end view looking from the left of Fig. 1. Fig. 4 is a section on line *x x*, Fig. 1. Fig. 5 is a face view, and Fig. 6 is an edge view, of the cam 19.

It is the object of my invention to provide an apparatus for the convenient and automatic filing of band-saws which are suspended so as to travel vertically through the apparatus.

As shown in the drawings, A is a table of any suitable or desired construction, preferably made of metal, having lugs at the corner, by which it may be bolted down. The table is also provided with pillow-blocks, as at 2, rising from one end, these being bored out to receive a shaft 3, which carries the crank-disk and cams by which the mechanism is actuated. Upon one end of the shaft 3 is a disk 4, having a pin in it, which serves as a crank-pin to give the proper throw to the file-carrier. Bent arms or brackets 6, also cast with the table, extend over one edge of the table A and being bored in line serve as guides for the shaft 7, which is slidable through these guides. Keyed to this shaft 7 are hangers, as at 8, and between the lower ends of these hangers extends an arched housing 9, and at one side of the housing are lugs, as at 10, carried also by the same hangers 8 and adapted to receive and hold the file, as will be hereinafter described.

11 is a pin which extends through lugs on the bracket or support 6 and at the end of the table A, which is opposite to the shaft-bearings 2. This pin serves for the support of an arm 12, which is caused to oscillate in a horizontal plane about the vertical bearing-pin 11. The end contiguous to the file-holder forms a flattened jaw 13, and this jaw is closable against a similar jaw 13^a, formed permanently upon

the side of the bracket 6. These jaws serve to hold the saw-blade, the upwardly-moving part of which passes up between these jaws. The saw will be suitably suspended by passing over a roller or rollers at the top, so that the upwardly-moving side will run fairly with the jaws, and the saw is fed upwardly between these jaws by a reciprocating pawl or lifter to be hereinafter described. The opposite end from the jaw 13 of the arm 12 has a socket made in it, and into this socket enters a shaft 14, which is slidable through standards 15, also cast upon the table A, the shaft 14 being substantially parallel with the slidable shaft 7 and the direction of travel of the file. A screw 16, turnable in threads in the end of the arm 12, has its inner end abutting against the end of the rod 14, which enters this arm, and by the screw the arm may be adjusted so as to cause the jaws 13 and 13^a to grip saws of different thicknesses. 17 is a spring fitting between the end of the arm 12 and the standard 15, and the tendency of this spring is to force the arm 12 outward and to close the jaws 13 13^a together with a light pressure sufficient to stay the saw in its movement, but not sufficient to prevent its being moved at the proper time by the feeding-pawl. The opposite end of the shaft 14 carries a roller or antifrictional device 18, and this contacts against a cam 19, which is mounted upon the main shaft 3 and turnable in line with the shaft 14 and roller 18. The cam 19 is so formed that after the feeder has advanced the saw one tooth the cam acts, through the rod 14 and upon the arm 12, to clamp the saw firmly between the jaws 13 13^a, and at this instant the file will be drawn across the saw, so as to produce the proper cut or abrasion upon the teeth. Thus, the teeth of saws of this class having a substantially transverse lower edge and an incline from the bottom of this edge to the top of the next tooth, the file may be set to cut the lower transverse edges of all the teeth, as may be desired, and then set to cut the inclined backs of the teeth, or all together, and when once set the apparatus may run for any definite time, as the adjustments are such that the file will only cut to a certain depth, and the saw may be passed over it definitely after this cut has been made without any further action upon the saw.

The file has its ends held in the arms or lugs 10 of the hangers 8. One of these lugs has a hole which is adapted to receive the point of the file, and the other has a hole made through it of such size as to receive a sleeve 20. This

sleeve has a triangular hole made through it, into which the other end of the triangular file is inserted and may be firmly locked in place by set-screws, as at 21. The sleeve has an arm 22 extending upwardly from one side, and a slot 23 is made in the side of the bracket 8, through which passes a screw 24. This screw enters the arm 22, and when loosened the arm may be moved a distance one way or the other, depending upon the length of the slot 23. It will be seen that the movement of this arm serves to turn the file, and thus the angle of the file with relation to the saw may be materially adjusted, the set-screw 24 being locked to hold the arm and the sleeve at the desired adjustment.

In order to swing the file into position to make a drawing cut across the teeth of the saw and to then swing it outwardly, so as to be returned out of contact with the saw, the hanger and support for the file are moved by a rod 25, which extends transversely across the apparatus and, as here shown, through the lower portion of one of the standards or brackets 6. The end of the rod 25 most distant from the swinging file-carrier is connected by a rocker-arm, as at 26, with a shaft 27, pivoted or journaled beneath the table and having at its opposite end a rocker-arm 28, in the upper end of which is journaled an antifrictional roller 29. This roller travels against a cam-face 30, which is here shown as made on the side of the disk which carries the cam 19, so that while the cam 19 is on the periphery or edge of the disk and operates the saw-gripping device the cam 30 is made on the side of the disk and serves to oscillate the rocker-arm 28 and its shaft, and thus reciprocate the rod 25. The rod 25 is so connected as to oscillate the file-carrier by the following mechanism: 31 is a cylindrical plug which is slidable within the cylindrical channel formed in the housing 9 and having a slot or opening in the bottom. The cylindrical plug 31 has a shank extending downwardly through the slot in the housing, and at the lower end it has a transverse sleeve, as at 32, and this is bored to receive the end of the rod 25. Between the sleeve 32 and the bracket through which the rod 25 passes is a spiral spring 33, acting against the sleeve 32, tending to push it and the file-carrier outwardly whenever relieved from the action of the cam. A wing-nut, as at 34, screwing upon the projecting end of the rod 25, serves to adjust the parts, lengthening or shortening the rod, so as to regulate the transverse swing of the file-carrier, and thus bring the file to any desired relation with the particular saw which is being operated upon. The shank connecting the cylinder 31 and the sleeve 32 is narrower than the slot in the bottom of the tubular housing, and this allows the shank to swing to one side or the other without binding against the sides of the channel or opening in the housing, and thus the

housing and file-carrier are allowed to swing inwardly to bring the file against the saw and afterward be moved outwardly by the action of the cam 31, and thus swing the file, as described. In order to reciprocate the housing and file-carrier, a connecting-rod 35 extends from the pin on the crank-disk to a pin upon the housing 9, and as this housing must be allowed to swing out and in it will be seen that the two pins by which the connecting-rod ends are united cannot always be parallel with each other. In order to overcome this difficulty and allow the connecting-rod to accommodate itself to the varying positions of the file-carrier, I prefer to make the connecting-rod with a sufficiently thin and deep web between its ends, so that it may have a twist or torsional movement sufficient to accommodate the varying positions of the pins by which its ends are connected. I have found that a very convenient connecting-rod for this purpose may be made of a hard elastic wood; but it may be understood that metal or other equivalent and sufficiently elastic material may be substituted, the object being to make a simple connection which will accommodate itself to the irregular movements of the file-carrier and without expensive ball-bearing or other joints.

The saw is advanced after each stroke of the file and while the file is withdrawn by a feed blade or pawl 36, which is movable between guide-pins, as at 37, projecting from the jaws 13 13^a, and its lower end is connected by a pin with the lever-arm 38. This lever-arm is actuated by a cam 39, which is here shown in the form of a segment projecting from the back of the disk 4, which carries the crank-pin. The construction of this portion of the apparatus is as follows: The lever-arm 38 has a pivot-pin extending through it intermediate of the ends and connecting it with the outer end of another lever-arm 40, which is pivoted, as at 41, to the bed-piece A, as shown. This pin 41 also passes through its lever-arm intermediate of the length, and this lever-arm 40 has a lug 42 projecting over the end of the lever-arm 38 and another arm 43 projecting over the bed-plate. Through the arm 42 passes a screw 44, the lower end of which presses upon the end of the lever 38, and through the arm 43 passes a screw 45, the lower end of which presses upon the bed-plate A.

The operation of this device will be as follows: When the file-carrier has been swung outward and is being returned to renew a stroke and cut the cam which actuates, the lever 40 will begin to act and pressing down upon this lever will raise the opposite end, which carries the lever 38, and will thus raise the feed-pawl 36, and as the upper end of this pawl engages with one of the teeth of the saw it will be seen that it will push the saw a distance equal to the length of the stroke. By adjusting the screws which pass through the

lugs on the lever 40 it will be seen that the stroke of the levers may be changed by letting them down or adjusting them with relation to each other, so that the pawl will engage teeth of saws at different distances. Thus any feed may be regulated. A spring, as at 46, connects the lever 40 with one of the standards or hangers 6 or may be otherwise conveniently arranged to return the lever-and-pawl mechanism after each stroke.

The housing 9 being constructed in the manner here shown incloses the cylindrical plug 31, on which it slides, covering it completely from above and leaving only a narrow slot below sufficient to permit the necessary swing of the housing and file-carrier, and by this construction I protect the slidable parts from any contact of the sharp steel filings from the saw, which would otherwise soon cut and destroy the slide or its guide.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a saw-filing machine of the character described, a mechanism by which the saw is advanced, said mechanism consisting of a fulcrumed lever, a cam by which the lever is oscillated, a second lever having a feed-pawl upon its outer end, said lever being pivoted to the end of the first lever, a screw through the first lever by which the pawl-carrying lever may be adjusted and a second screw passing through the cam-actuated lever and having its point resting upon the bed or table.

2. In a saw-filing apparatus of the character described, a base, brackets fixed thereto, a shaft slidable through the brackets and hang-

ers secured to said shaft, file-supports carried by the hangers, a tubular housing having a slotted opening at the bottom, a cylindrical plug fitting and slidable within the housing, connections between said plug, and a cam by which the housing is oscillated transversely, a crank and a connecting-rod between said crank and the file-carrier whereby the latter is reciprocated, said connecting-rod having a thin transversely-yielding web between its ends whereby the transverse swing of the file-carrier is effected.

3. In a saw-filing machine, a longitudinally-movable and transversely-swinging file-carrier, a connecting-rod connecting the crank with the file-carrier, said crank having a thin web between its ends capable of torsional movement to allow the swinging of the file-carrier.

4. In a saw-filing machine, clamps between which the saw is vertically held, and a feeding device by which it is advanced, a longitudinally-reciprocating file-carrier, guiding means for said carrier, a hollow cylindrical housing carried by the file-carrier and having a slot in its lower portion, a cylindrical plug slidable within the housing said housing serving to prevent saw-filings from coming in contact with the moving parts and means for oscillating the plug.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

CLARENCE M. HENDERSON.

Witnesses:

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