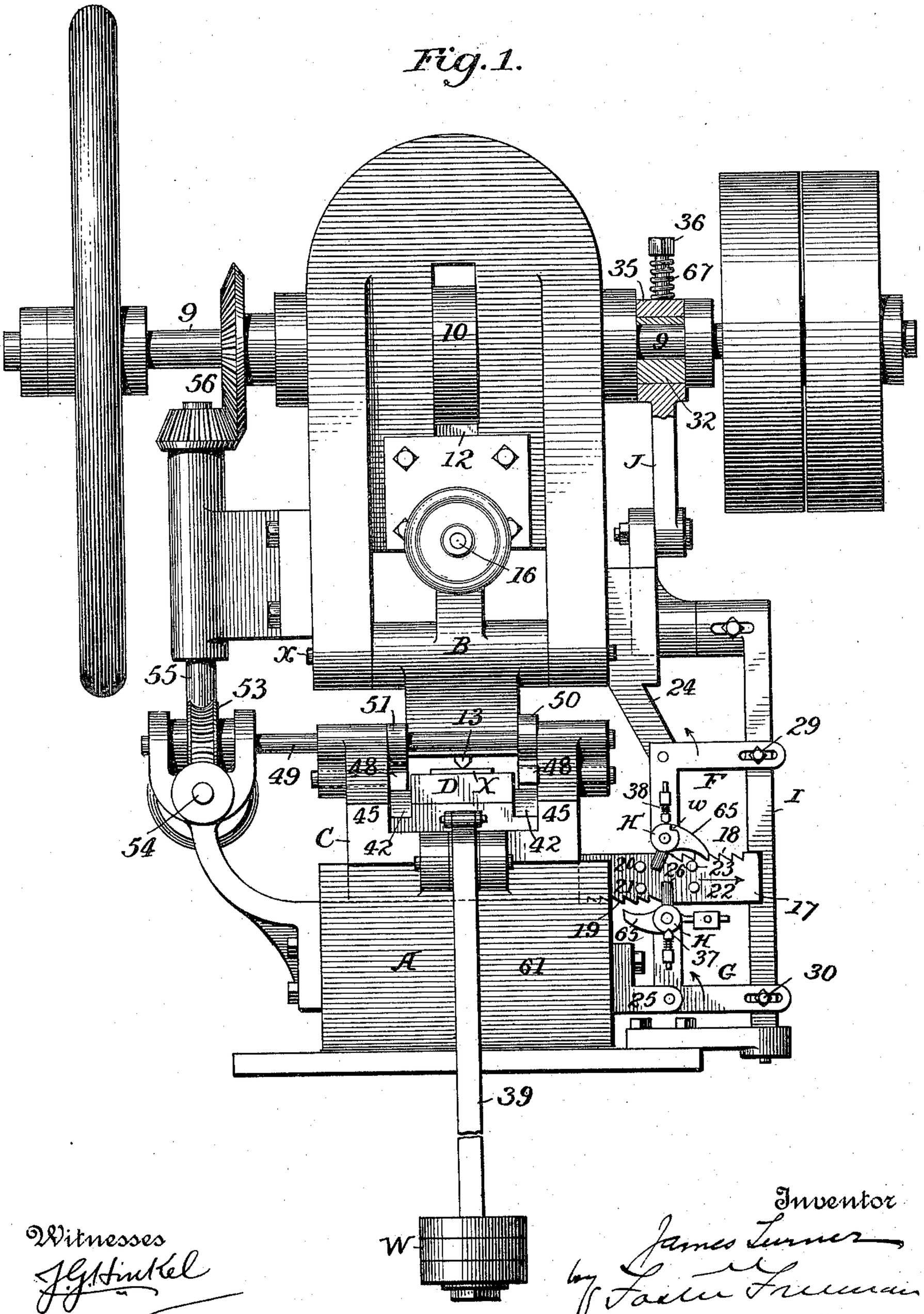
(No Model.) 4 Sheets—Sheet 1.

J. TURNER.

MACHINE FOR CUTTING RASPS.

No. 598,585. Patented Feb. 8, 1898.

Fig. 1.



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(No Model.) 4 Sheets—Sheet 2.

J. TURNER.

MACHINE FOR CUTTING RASPS.

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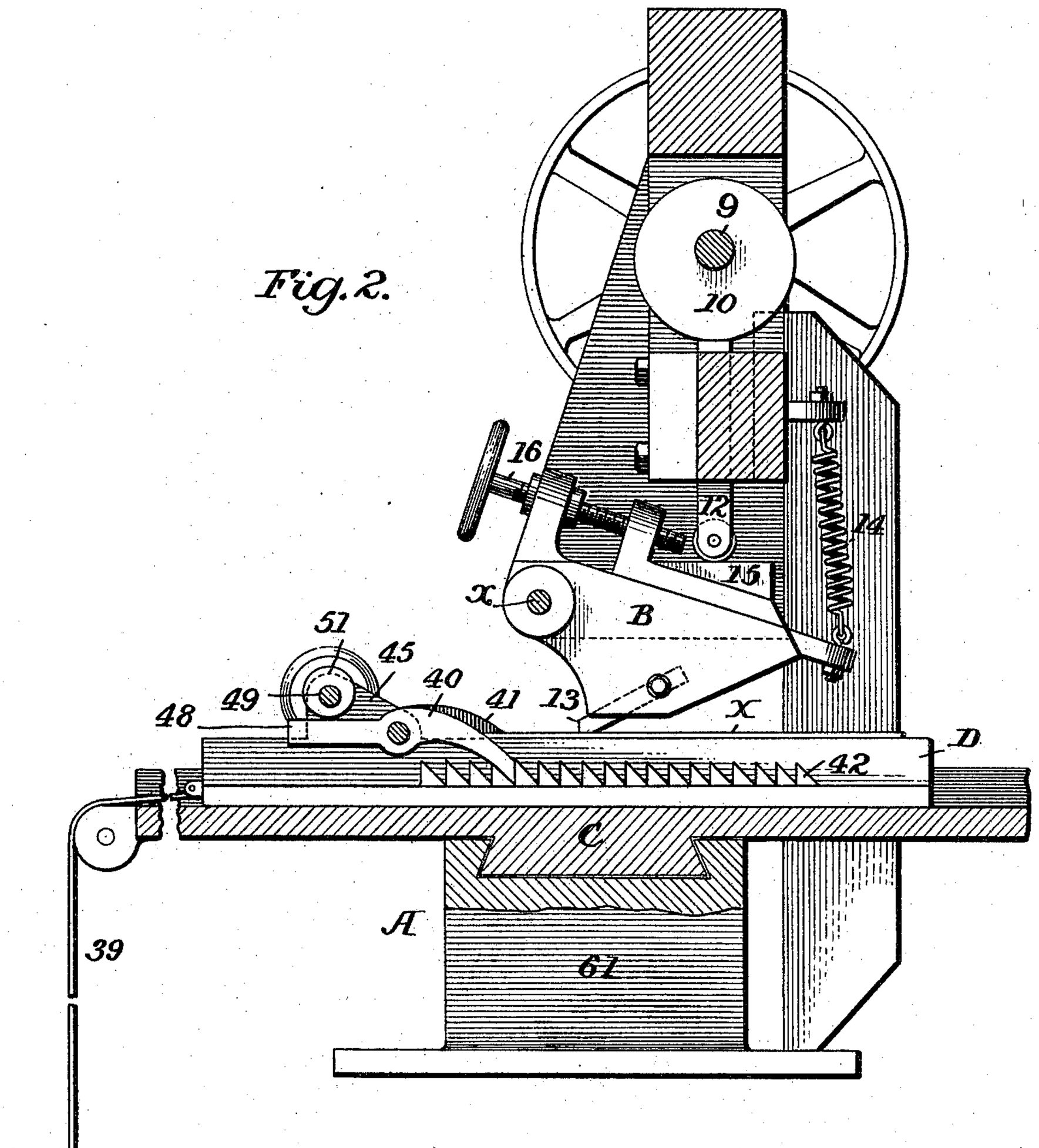
Fig. 2.



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(No Model.)

4 Sheets—Sheet 3.

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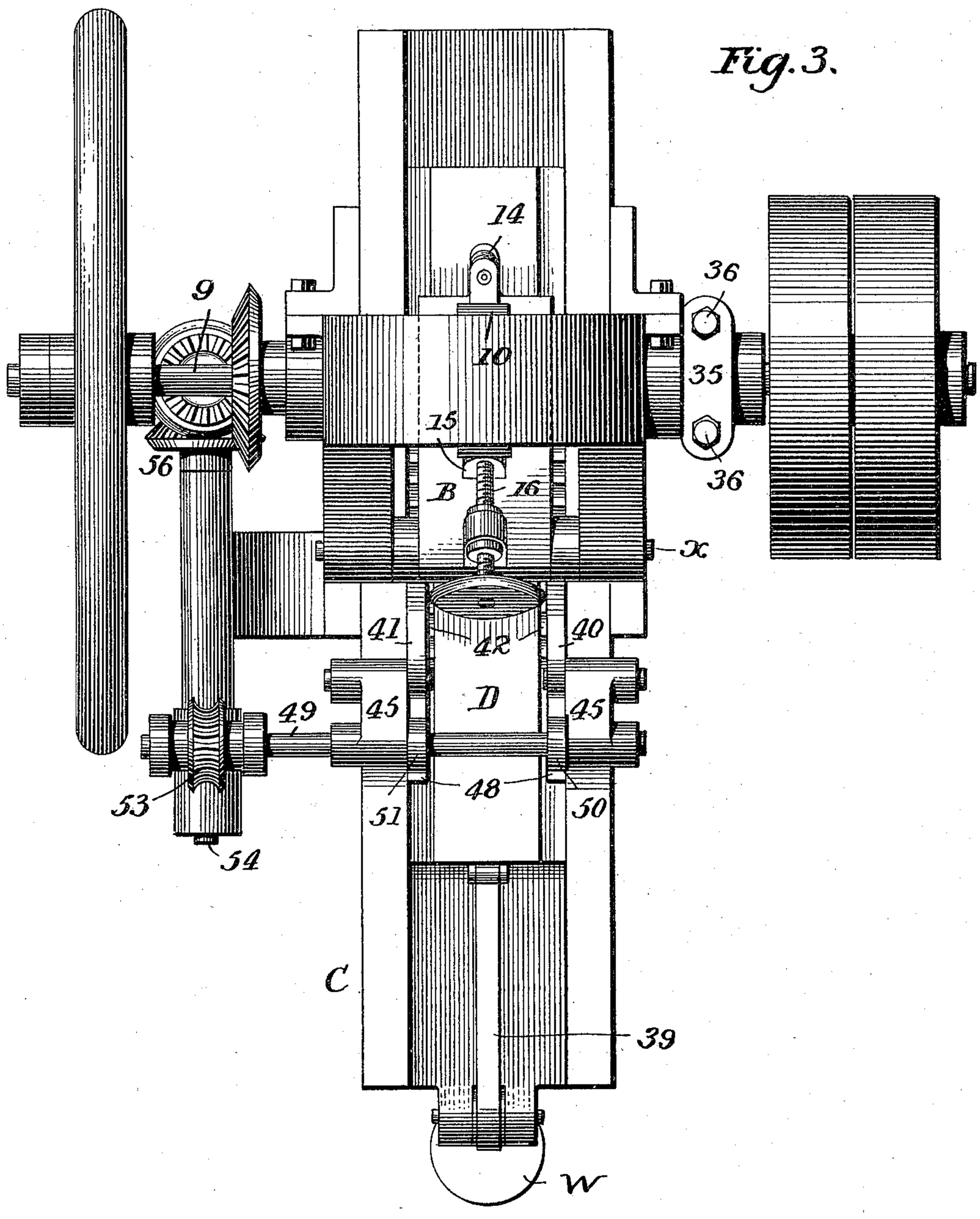
MACHINE FOR CUTTING RASPS.

No. 598,585. Patented Feb. 8, 1898.

Fig. 3.



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Attorney 6

(No Model.)

4 Sheets—Sheet 4.

J. TURNER.

MACHINE FOR CUTTING RASPS.

No. 598,585. Patented Feb. 8, 1898.

Fig. 4.

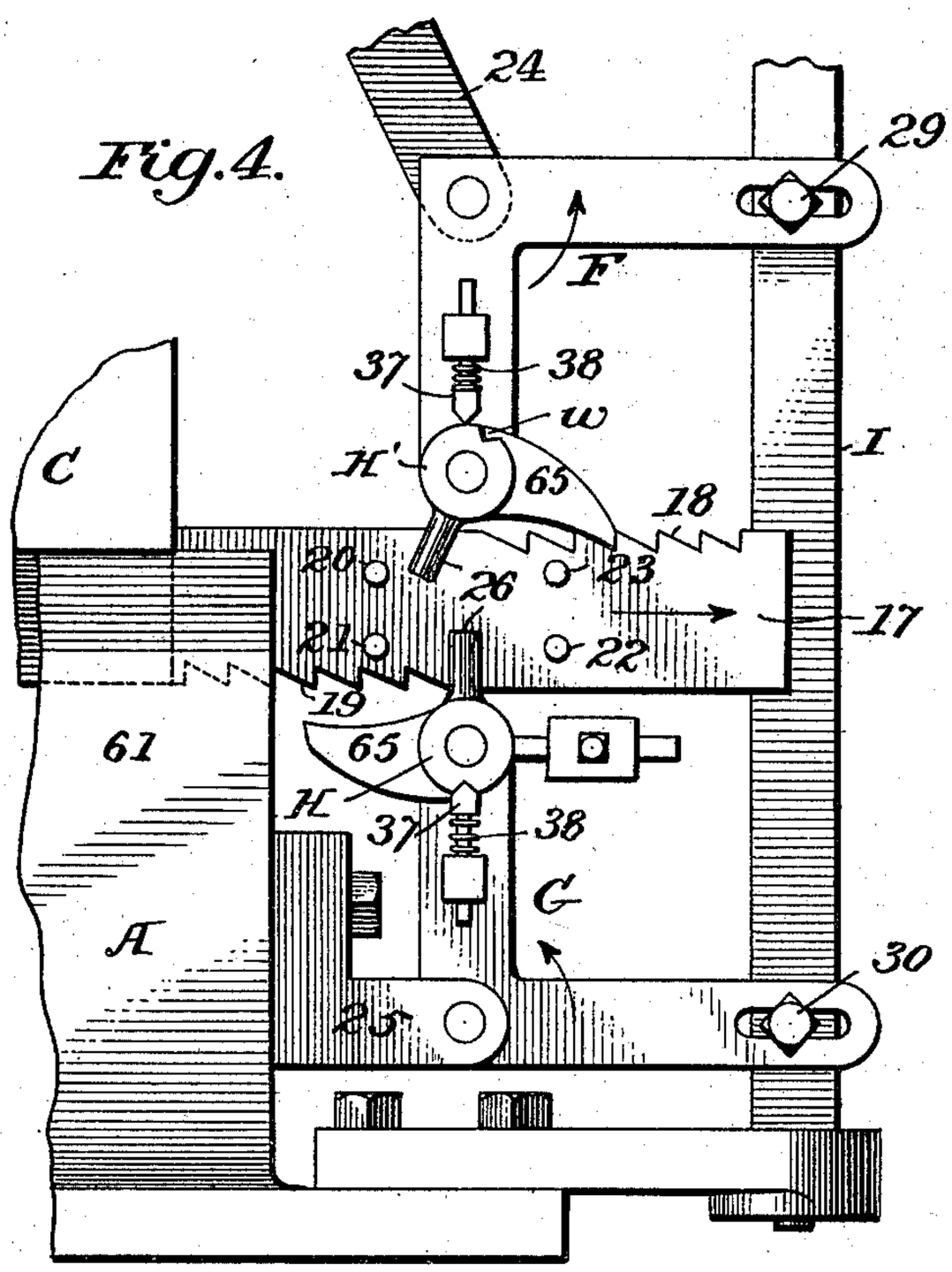
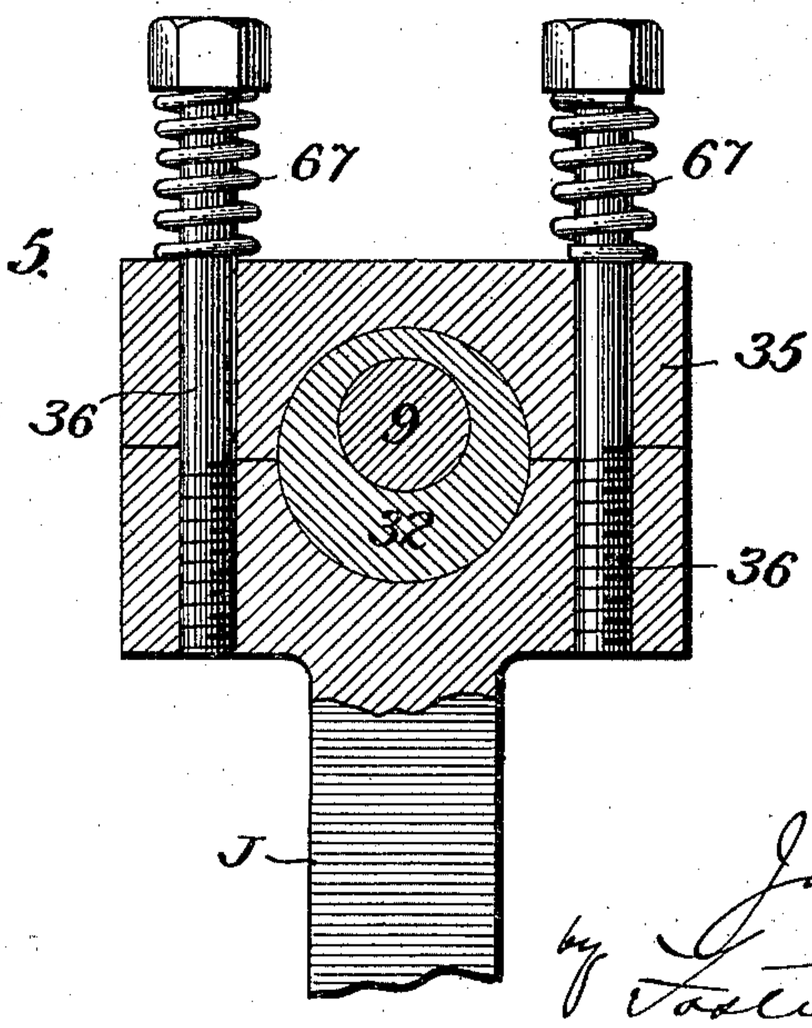


Fig. 5.



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UNITED STATES PATENT OFFICE.

JAMES TURNER, OF PATERSON, NEW JERSEY, ASSIGNOR TO THE KEARNEY & FOOT COMPANY, OF NEW YORK, N. Y.

MACHINE FOR CUTTING RASPS.

SPECIFICATION forming part of Letters Patent No. 598,585, dated February 8, 1898.

Application filed November 9, 1896. Serial No. 611,536. (No model.)

To all whom it may concern:

Be it known that I, JAMES TURNER, a citizen of the United States, residing at Paterson, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Machines for Cutting Rasps, &c., of which the following is a specification.

My invention relates to that class of machines for cutting files, rasps, &c., in which a blank of proper shape and dimensions is operated upon at successive portions by means of a reciprocating tool; and my invention consists in mechanism whereby the blank is automatically properly fed both laterally and longitudinally and whereby a peculiar movement is imparted to the cutting-tool, as fully set forth hereinafter, and as illustrated in the accompanying drawings, in which—

Figure 1 is an end view, in part section, illustrating my improved file or rasp cutting machine. Fig. 2 is a longitudinal sectional elevation. Fig. 3 is a plan view. Fig. 4 is an enlarged detached view of the devices employed for imparting the lateral feed to the carriage. Fig. 5 is an enlarged detached sectional view of a safety device.

The frame A of the machine is suitably constructed to support the parts hereinafter set forth, and has bearings at the upper part for a driving-shaft 9, upon which is a cam 10, that operates upon a reciprocating slide 12, from which motion is imparted to the cutter 13.

The cutter 13 may be arranged to operate in any of the usual ways; but I have found that great advantage results from supporting it in a rocking holder B, which holder is pivoted at x to the frame of the machine and connected with a spring 14, which tends to lift the holder by drawing one end of it upward. On the holder is an adjustable bearing 15, receiving an adjusting-screw 16, by turning which the bearing (which is wedge-shaped) may be drawn farther in or carried farther out from the pivot of the frame and beneath the end of the slide 12 to thereby vary the extent to which the holder is thrown down by the reciprocation of the said slide.

The tool 13 may be substantially square in cross-section or triangular or diamond-shaped, as may be found desirable, according to the character of the article that is to be cut, as to whether it is a rasp or file, and the angle of the tool may also vary according to different circumstances; but, as shown, it is arranged at an angle of about thirty degrees for cutting rasps. As thus arranged the oscillation of the holder B not only carries the point of the tool downward against the blank which is beneath it, but also backward toward the heel of the blank, thereby lifting up a portion of the metal to form a tooth very much in the same manner in which it is lifted up by the operation in hand-cutting, and it will be seen that this is effected by means of a holder oscillating on a point at one end and without any jointed connection of the tool with the holder. By this means very certain and uniform results are secured. While I have shown a rotating cam or eccentric and a reciprocating slide for imparting the rocking movement to the holder, it will be evident that other well-known mechanical devices may be employed with like results—for instance, the cam or eccentric 10 may bear directly upon the adjustable bearing-wedge 15 without the intervention of the slide 12.

In transverse guides of the bed of the frame A slides the carriage C, the said carriage being moved laterally back and forth for the purpose of enabling the tool to cut successive teeth alongside of each other transversely across the blank. The longitudinal movement of the blank for the purpose of cutting successive teeth from the point toward the heel of the blank is effected by securing the blank X to a carrier D, which slides longitudinally upon the carriage, but with an intermittent movement, each forward movement of the carrier being effected after all of the teeth in a transverse row have been cut after the lateral movement of the carriage.

Different means may be employed for imparting the lateral movements intermittently to the carriage and the longitudinal movements intermittently to the carrier. I will now describe those which I have found to be exceedingly effective in operation.

From one side of the carriage C extends an arm 17, which has near the outer end at the

top a rack 18 and at the lower edge near the junction with the carriage another rack 19, the teeth of the two racks being set in reverse directions. From the side of the arm 17 extend four pins 20 21 22 23.

To brackets 24 25, secured to the frame of the machine, are pivoted two bell-crank levers F G. The lever F carries a pawl H', having a tooth 65 and an arm 26 nearly at right angles with said tooth. The tooth 65 of the pawl H' engages the rack 18, and the arm 26 of said pawl extends downward between the pins 20 23. A similar pawl H is pivoted to the lever G and also has a tooth 65 and an arm 26, the latter extending upward between the pins 21 22. One arm of each lever F G is slotted, and pins 29 30 extend from a bar 1 into the slots of said arms, as shown, the said bar being connected to and forming part of a slide, to which a reciprocating motion is imparted through a connecting-rod J by a cam or eccentric 32 on the shaft 9. By the reciprocation of the slide and bar 1 the levers F G are rocked simultaneously in opposite directions—that is, so as to carry the two pawls simultaneously in opposite directions. Each pawl is weighted to normally engage its rack and is combined with a friction device which tends to hold it in position when set away from the rack—for instance, there is a pointed block 37 pressed by a spring 38 toward the hub of the pawl, in which there is a notch *w*, into which the pointed end of the slide can enter and is there held with sufficient force to tend to hold the pawl open, but not so firmly but what a strong pressure upon the arm or pin 26 will move the pawl out of place and allow the end of the slide to rest on the hub of the pawl.

Assuming the parts to be in the position shown in Figs. 1 and 4, if the bar I is raised the levers F G each swings in the direction of its arrow, and the pawl H' engages a tooth of the rack 18 and carries the arm 17 and the carriage one step to the right, and this action takes place at each upward movement of the bar I until the pin 20 makes contact with the arm 26 of the pawl, when the latter will be turned or swung until the locking-block 37 enters the notch *w* and holds the pawl out of engagement. At the same time the pin 21 makes contact with the arm 26 of the pawl H and throws the latter into engagement with the rack 19. Each upward movement of the bar I thereafter brings the pawl H into engagement with a tooth of the rack 19 and feeds the carriage C in a reverse direction. By this construction and arrangement the carriage C is moved step by step laterally first in one direction and then in the other, the feed and change of direction being entirely automatic.

If, owing to any disarrangement of the parts, both pawls were to simultaneously engage the racks, it would result in injury to the apparatus if the bar I was to continue its movement. In order to prevent such injury, I provide the connecting-rod J with a cap 35, Fig. 5, through which extend two bolts 36 36, between the head of each of which and the cap is a spring 67, which tends to hold the cap in place and in contact with the cam 32 under normal conditions. If, however, there is any resistance to the movement of the bar I, the cap 35 will lift and permit the eccentric 32 to rotate without lifting the connecting-rod or its bar. The yielding connection may be at any other suitable point.

The step-by-step longitudinal movement of the carrier D upon the carriage C is effected by means of a weight W, connected by a cord or band 39 with the carrier, and two pawls 40 41, engaging side racks 42 upon the carrier. Each of these pawls 40 41 is pivoted adjacent to side ears 45 on the carriage C, between which the carrier slides, and each pawl has a rearwardly-projecting arm 48, which passes beneath a shaft 49, upon which are two cams or eccentrics 50 51. These parts are so arranged and operated that after the tool has operated upon the blank, so as to complete the raising of the number of teeth that are in a transverse line and raising the last tooth at one edge, the cam 50 or 51 adjacent to that edge will depress the tail of the adjacent pawl 40 or 41 and lift the same, while the other cam or eccentric will commence to permit the opposite pawl to descend, so that as one pawl passes from one tooth of one rack the other pawl will enter the space between the next two forward teeth of the other rack, and the weight will carry the carrier longitudinally the distance of one tooth, after which the carriage will begin to move laterally and carry the blank by successive steps beneath the tool until another transverse row of teeth is cut, when the above-described operations will be repeated, and the carrier and blank will be moved one step farther longitudinally, and so on until the surface of the blank has been entirely cut.

Any suitable means may be employed for rotating the shaft 49, carrying the cams 50 and 51. As shown, the said shaft is driven by means of a worm-wheel 53 on the shaft engaging a worm on a shaft 54, which is driven by means of bevel-gears from a vertical shaft 55, which in turn is driven by a pair of bevel-gears 56 from the shaft 9, these gears being proportioned to give the revolution to the shaft 49 at the desired rate of speed.

While the machine as constructed and described is one which is primarily intended for cutting rasps, it will of course be evident that it may be used with but slight modification for cutting files and that some of the parts may be used in connection with the cutting of both round and flat files.

Without limiting myself to the precise construction and arrangement of parts shown and described, I claim as my invention—

1. The combination in a rasp-cutter, of the holder B, pivoted at a fixed point *x* above the bed, a cutting-tool supported by the holder

at an acute angle to the bed with its point adjacent a vertical plane passing through the pivot, a reciprocating device for operating said holder, and a movable wedge-like bearing 15, for varying the extent of oscillation of the holder, substantially as described.

2. The combination with the frame and cutter, of the carriage having a step-by-step movement transversely, a carrier for the blank having a similar movement at right angles to the carriage, an arm having reverse racks and projecting beyond the carriage at the side thereof, and means supported by a stationary part of the machine for alternately engaging said racks to move the carriage, substantially as shown and for the purpose described.

3. The combination with the frame and cutter, of the carriage having a transverse movement step by step, a carrier for the blank having a longitudinal movement step by step, an arm attached to the carriage at one side and provided with reverse racks, levers pivoted to stationary parts of the machine and provided with pawls for alternately engaging the racks, and means for rocking the levers to operate the pawls, substantially as described.

4. The combination with the frame and cutter, of the carriage having a transverse movement step by step, a carrier for the blank having a longitudinal movement step by step, an arm projecting from the carriage at one side and having reverse racks, pawls for alternately engaging said racks and having projections therefrom, means supported by a stationary part of the machine for operating the pawls, and pins or projections on the arm for engaging the projections of the pawls, substantially as described.

5. The combination of the carriage carrying the blank, the arm having the reverse racks and the pawls for engaging said racks, the cam 32, and a connecting-rod provided with a yielding cap, substantially as shown and for the purposes described.

6. The combination of the cutter, the carriage, and the carrier, an arm projecting beyond the carriage and having reverse racks, pawls for engaging the racks, and means for operating the pawls, the said means comprising in part a cam independent of the cutter-operating cam, and a connecting-rod provided with a yielding cap, substantially as described.

7. The combination of the blank-holding carrier D, means, as a weight, for moving it in one direction, racks at the sides thereof, pawls supported adjacent to the carrier and cams bearing directly upon arms of the pawls for throwing the pawls alternately out of engagement with the racks, substantially as described.

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

JAMES TURNER.

Witnesses:
CHAS. E. WATTS,
SANDFORD D. FOOT.