No. 627,532. Patented June 27, 1899.

W. N. RUMELY.

RASP CUTTING MACHINE.

(Application filed July 16, 1898.)

(No Model.) 2 Sheets—Sheet 1.

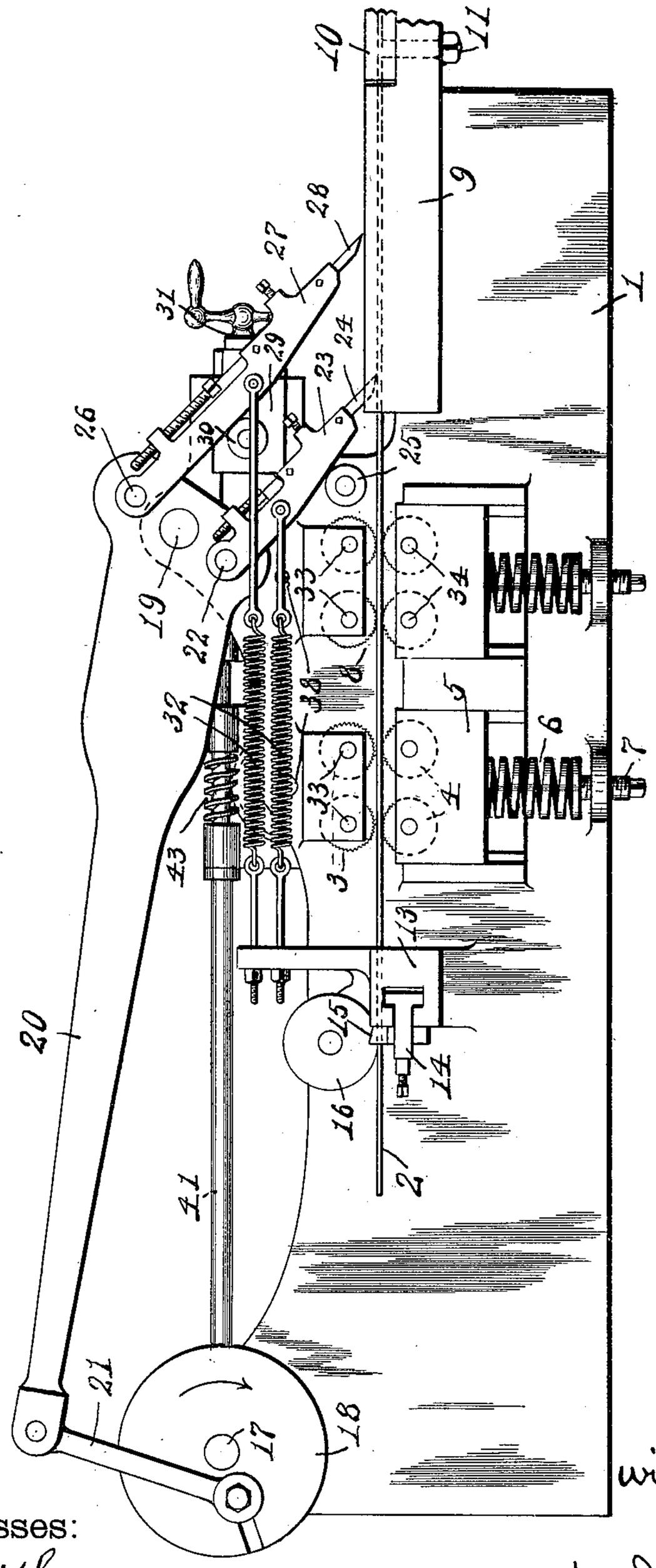

FIG. 1.

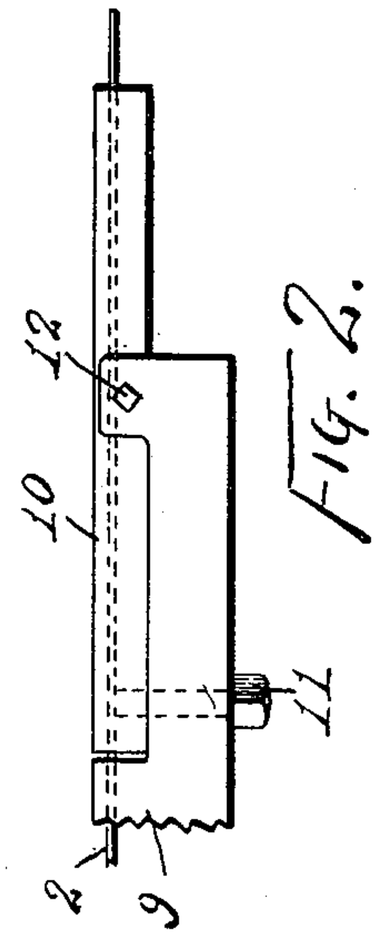

FIG. 2.

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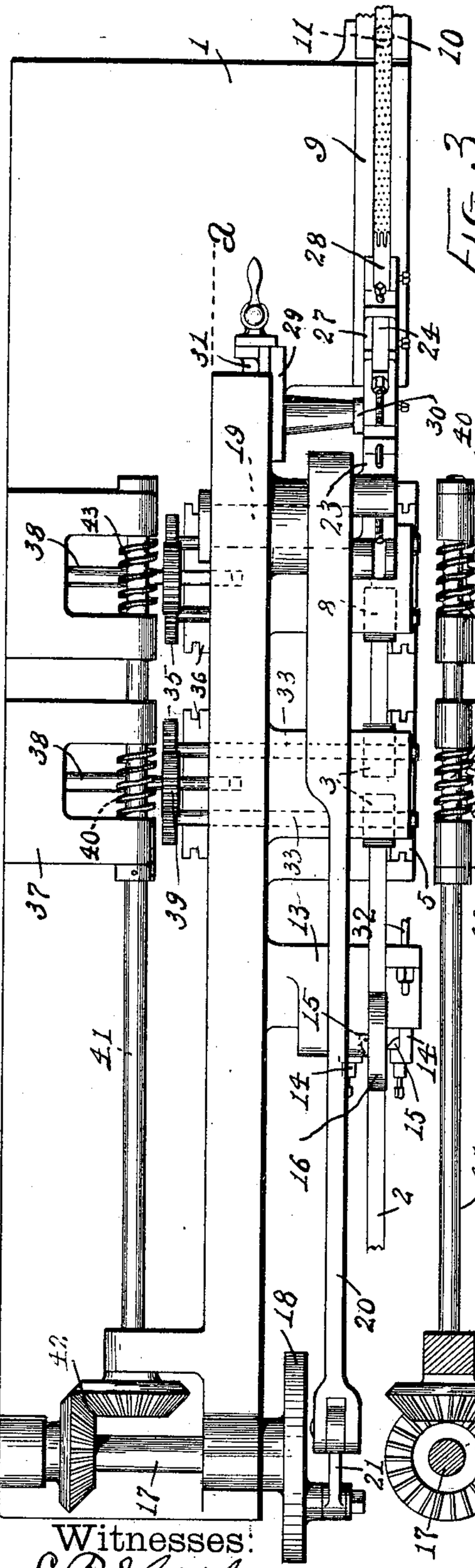

FIG. 3.

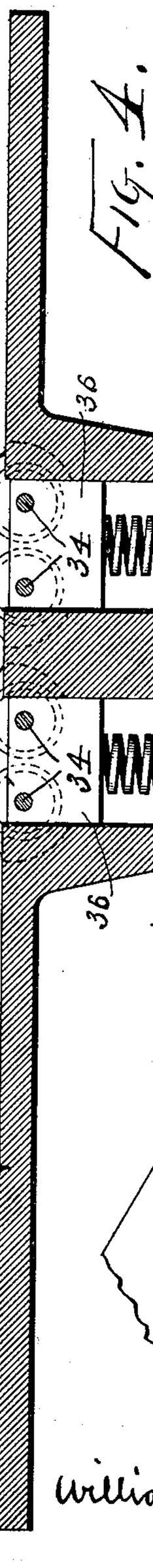

FIG. 4.

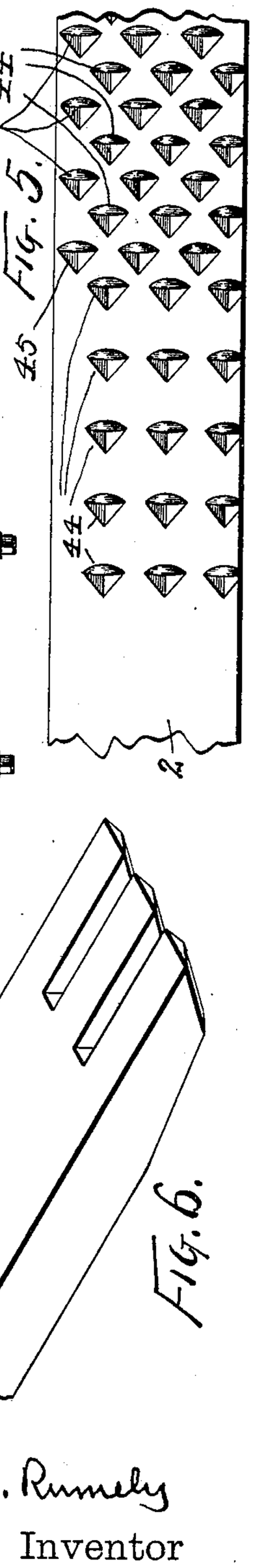

FIG. 5.

FIG. 6.

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UNITED STATES PATENT OFFICE.

WILLIAM N. RUMELY, OF LA PORTE, INDIANA.

RASP-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 627,532, dated June 27, 1899.

Application filed July 16, 1898. Serial No. 686,098. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM N. RUMELY, of La Porte, La Porte county, Indiana, have invented certain new and useful Improvements in Rasp-Cutting Machines, of which the following is a specification.

This invention pertains to improvements in machines designed for the toothing of long strips of steel to be employed for rasping purposes in agricultural implements and the like.

The improvements produced by me in machines of this class will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a front elevation of a rasp-cutting machine exemplifying my invention; Fig. 2, a fragment from the extreme right hand of the machine and shown separate from Fig. 1 merely on account of limited length of sheet for the drawings; Fig. 3, a plan of the machine; Fig. 4, a vertical longitudinal section in the plane of line *a* of Fig. 3; Fig. 5, a plan of the rasp-strip, illustrating the product of the machine; and Fig. 6, a perspective view of one of the tooth-cutters.

In the drawings, 1 indicates the frame of the machine, whose form is immaterial so long as it is adapted to give proper rigid support to the other parts of the machine; 2, the steel strip on which the rasp-teeth are to be cut, this strip passing longitudinally along the frame of the machine and being supported, fed, and operated upon as hereinafter described, the strip being in ordinary practice generally twelve or more feet long and about an inch and a quarter in width and an eighth of an inch in thickness; 3, a pair of corrugated feed-rolls, disposed one in advance of the other and supported by the framing in a position over the rasp-strip, the axes of the rolls being at right angles to the length of the rasp-strip and the rolls engaging the uppermost flat surface of the strip, which is the surface on which the rasp-teeth are to be produced; 4, a similar pair of feed-rolls engaging the rasp-strip oppositely under the rolls 3; 5, a bearing-block vertically sliding in the frame and carrying the journals of rolls 4; 6, a spring urging block 5 upward so that the strip will be pinched between the upper feed-rolls 3 and the lower feed-rolls 4; 7, a screw for adjusting the tension of spring 6 and regulating the force with which the feed-rolls referred to pinch upon the rasp-strip; 8, a second group of four feed-rolls similar to those just described and similarly mounted and spring provided, this second group of feed-rolls engaging the strip in advance of the other group, it being understood that the strip feeds from the left to the right; 9, a horizontal anvil supported by the frame in advance of feed-rolls 8, the upper surface of this anvil being provided with a longitudinal channel in which is supported the rasp-strip, which fits the channel nicely sidewise; 10, a channeled bar secured to and extending in advance of the anvil and forming a prolongation of the channel therein; 11, a vertical pivot connecting the rear end of bar 10 with the anvil and permitting the bar to be adjusted sidewise angularly with reference to the line of the channel in the anvil; 12, set-screws supported by the frame and engaging the sides of bar 10 and serving in angularly adjusting that bar; 13, a tool-block supported by the frame in the line of the rasp-strip to the rear of the first group of feed-rolls; 14, a pair of tool-holders carried by this tool-block, one at each side of the rasp-strip; 15, trimming-tools, one carried by each tool-holder, these tools engaging the edges of the rasp-strip and trimming them nicely to desired finished width of the rasp-strip, which width will correspond with the width of the channel in the anvil and in bar 10; 16, a roll supported by the frame and having its periphery engaging the upper surface of the rasp-strip between the two trimming-tools 15, the rasp-strip resting on the tool-block 13, which supports it, roller 16 preventing the rising of the strip while the trimming-tools operate upon it; 17, the main shaft of the machine, journaled in the frame at the end opposite the anvil, this shaft to be provided with any suitable pulleys or gears by means of which the motive power can be transmitted to the machine; 18, a crank on the front end of this shaft; 19, a horizontal pivot supported by the frame parallel with main shaft 17 in a position above and to the rear of the anvil; 20, a lever mounted on pivot 19 and extending rearwardly toward crank 18; 21, a link connecting the rear end of arm 20 with crank 18, the arrangement being obviously

such that as the crank rotates the lever 20 will be oscillated; 22, a horizontal pivot carried by lever 20 below pivot 19; 23, a tool-holder having its heels mounted on pivot 22, this tool-holder projecting from its heel-pivot diagonally downward toward the anvil; 24, a cutter secured in tool-holder 23 and projecting from the free end thereof downwardly into the channel of the anvil over the rasp-strip, this cutter having its active end formed with a series of cutting-teeth appropriate to the cutting of the alternate cross-rows of rasp-teeth in the strip, the tool-holder being provided with appropriate and usual devices for securing and adjusting the cutter therein; 25, a roller rigidly supported by the bed under tool-holder 23 and engaging the under surface of that tool-holder and forming a guiding support for the tool-holder as the tool-holder is thrust diagonally downward toward the anvil by the action of lever 20; 26, a pivot carried by lever 20 above its main pivot 19; 27, a second tool-holder, similar to tool-holder 23, its heel being mounted on pivot 26 and its free end projecting down toward the anvil in advance of tool-holder 23; 28, a cutter carried by tool-holder 27 and having a series of cutting-teeth appropriately adapted for the production of the cross-rows of rasp-teeth intermediate of the cross-rows produced by cutter 24; 29, a block supported by the bed at the side of tool-holder 27 and arranged for fore-and-aft motion of adjustment; 30, a roller carried by this block and engaging under tool-holder 27; 31, an adjusting-screw for moving block 29; 32, springs linked to tool-holders 23 and 27 and to the frame and acting to strain those tool-holders rearwardly against their supporting-rolls 25 and 30; 33, the shafts of the upper feed-rolls; 34, the shafts of the lower feed-rolls; 35, gears on shafts 33 and 34, the gear on each upper shaft 33 meshing with the gear on the corresponding lower shaft; 36, blocks carrying the inner bearings of the lower feed-roll shafts and spring-mounted, like blocks 5; 37, bearings supported by the frame for certain feed mechanism; 38, a pair of shafts mounted in the frame parallel with the feed-roll shafts, there being one of these shafts 38 disposed centrally over each group of feed-rolls; 39, a gear on each of shafts 38 engaging the gears 35 on the appropriate pair of upper feed-roll shafts; 40, a worm-gear on each of shafts 38; 41, a main feed-shaft longitudinally supported by the frame; 42, bevel-gearing connecting feed-shaft 41 with main driving-shaft 17; 43, worms on shaft 41 and engaging worm-wheels 40; 44, the alternate cross-rows of rasp-teeth in the strip, being the rasp-teeth produced by cutter 24, and 45 the intermediate rows of rasp-teeth on the strip, being the rows produced by cutter 28.

The rasp-strips as they come from the mill frequently vary a trifle in width, and the edges are more or less rough and irregular. The machine provides for trimming the strips to even width. An inspection of Fig. 5 shows that the teeth of cross-rows 44 are closer to one edge of the strip than the other. The result of forming these rows of teeth in the strip is that one edge of the strip is stretched more than the other, thus curving the strip edgewise. The intermediate cross-cuts 45 favor the opposite edge of the strip and tend in a certain degree to curve the strip edgewise in an opposite direction and compensate for the curvature produced by the other rows of teeth and straighten the strip; but the curving effect of the second series of cross-rows of teeth cannot be depended upon to effect a perfect compensation for the curving produced by the first cross-rows of teeth, the consequence being that the completed rasp-strip tends to come from the machine with an edgewise curve. My machine provides for straightening the strip edgewise after it leaves the anvil. Shaft 17 being put in motion results in the forward feeding of the strip by means of the feed-rolls, the feed being positive, even, and powerful. At the same time trimming-tools 15 trim the edges of the entering-strip, so that when the strip reaches the channel in the anvil it will be of even width and fit the channel. The tools 15 illustrated are ordinary stationary side tools; but any equivalent trimming-cutters may be substituted for them.

At each rotation of motion-shaft 17 pivot 22 is forced diagonally toward the anvil, thus forcing cutter 24 into the strip, the speed of advance of the cutter being greater than that of the strip, whereby the cutter produces a cross-row of rasp-teeth. This occurs at each rotation of main shaft 17, the consequence being that the cross-rows produced by cutter 24 will be evenly spaced along the length of the strip, it being understood that the feed-gearing is to be proportioned to produce the appropriate spacing-distance. As cutter 24 descends to attack the strip roller 25 supports the tool-holder 23 and insures an accurate and regular path for the penetrating motion of the cutter. The feed-rolls advance the strip continuously. When the cutter is making its upward idle stroke, then the feed-rolls have only to advance the strip; but when the cutter has begun its attack on the strip it tends to push the strip forwardly at speed in excess of regular-feeding speed for the strip, and at such times it is the duty of the feed-rolls to advance the strip regularly and resist the tendency of the cutter to increase the rate of advance, for if the cutter is allowed to have an intermittent effect upon the rate of advance of the strip that effect is liable to be irregular and erratic, resulting in spacing which is not uniform.

With cutter 24 only in action the strip would be provided only with cross-rows 44. (Seen in Fig. 5.) It is the duty of cutter 28 to produce the intermediate cross-rows 45, disposed midway between the cross-rows 44, produced by cutter 24. The action of cutter 28 is the

same as that of cutter 24, except that the cutters act alternately, one cutter attacking the strip while the other is rising. Roller 30 is to be adjusted forward or back until the cross-rows produced by cutter 28 are midway between those produced by cutter 24. Adjusting roller 30 forwardly causes cutter 28 to attack the strip at an advanced point with reference to the cross-rows produced by cutter 24, and adjusting the roller to the rear causes cutter 28 to attack the strip at a point of greater retreat. Perfect accuracy of relative positions of alternate and intermediate cross-rows of rasp-teeth may be secured by the adjustment of roller 30.

Channeled bar 10 is to be adjusted angularly sidewise, so as to beat a transverse crook into the channel formed by the anvil-channel and bar-channel taken together, this crook in the channel being adjusted in such direction and to such degree as to cause the strip to become straight as it leaves the machine.

I claim as my invention—

1. In a rasp-cutting machine, the combination, substantially as set forth, of a frame, a channeled anvil supported thereby, feed-rolls supported by the frame to the rear of and in line with the channel of the anvil, a lever pivoted to the frame above and to the rear of the anvil, tool-holders pivoted to the lever and carrying cutters presenting themselves forwardly over the anvil, a crank-shaft journaled in the frame, a link connecting the crank thereof with said lever, and positively-transmitting gearing connecting said crank-shaft with said feed-rolls and serving to turn the feed-rolls regularly in a forward direction, and prevent their being turned irregularly by the action of said cutters.

2. In a rasp-cutting machine, the combination, substantially as set forth, of a frame, a channeled anvil supported thereby, feed-rolls supported by the frame in line with the channel of the anvil, a lever pivoted to the frame above the plane of the anvil, tool-holders pivoted to the lever and carrying cutters presenting themselves over the anvil, a crank-shaft journaled in the frame, a link connecting the crank thereof with said lever, mechanism for transmitting forward rotary motion to the feed-rolls, and trimming-cutters supported by the frame to the rear of the feed-rolls and in the planes of the edges of the channel in the anvil constructed and arranged to act as a resistance to the advance of the strip.

3. In a rasp-cutting machine, the combination, substantially as set forth, of a frame, a channeled anvil supported thereby, feed-rolls supported by the frame in line with the channel of the anvil, a lever pivoted to the frame above the plane of the anvil, tool-holders pivoted to the lever and carrying cutters presenting themselves over the anvil, a crank-shaft journaled in the frame, a link connecting the crank thereof with said lever, mechanism for imparting forward motion of rotation to said feed-rolls, rollers supported under said tool-holders by the frame, and a carrier for one of said rollers arranged for adjustment in the frame to move the roller carried by it to selected positions closer to or farther from the vertical plane of the other roller.

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