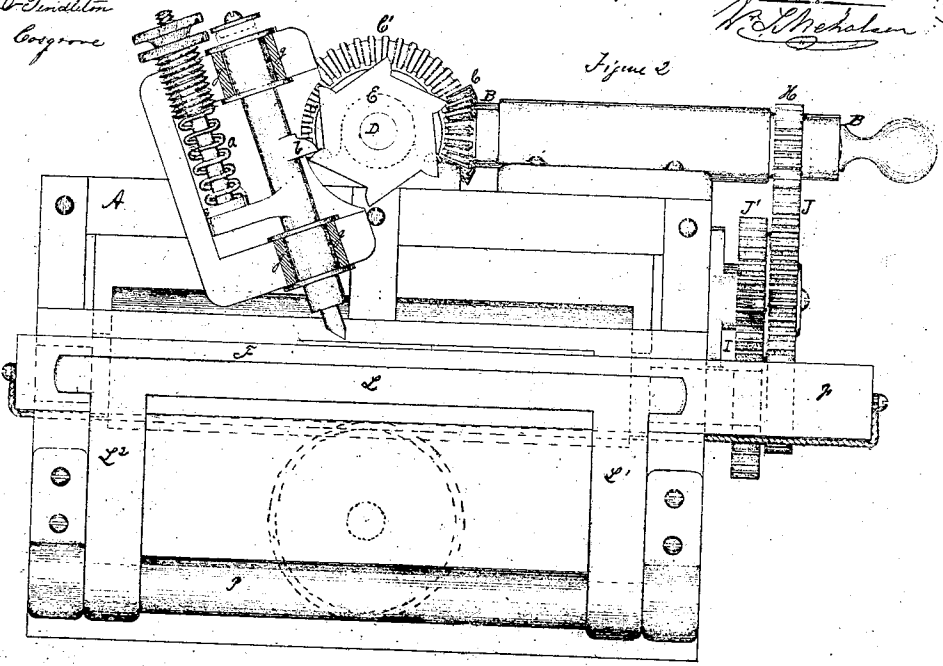


Witness
 C. L. Hamilton
 J. M. Cochrane

Inventor
 W. S. Mehalan

Figure 2



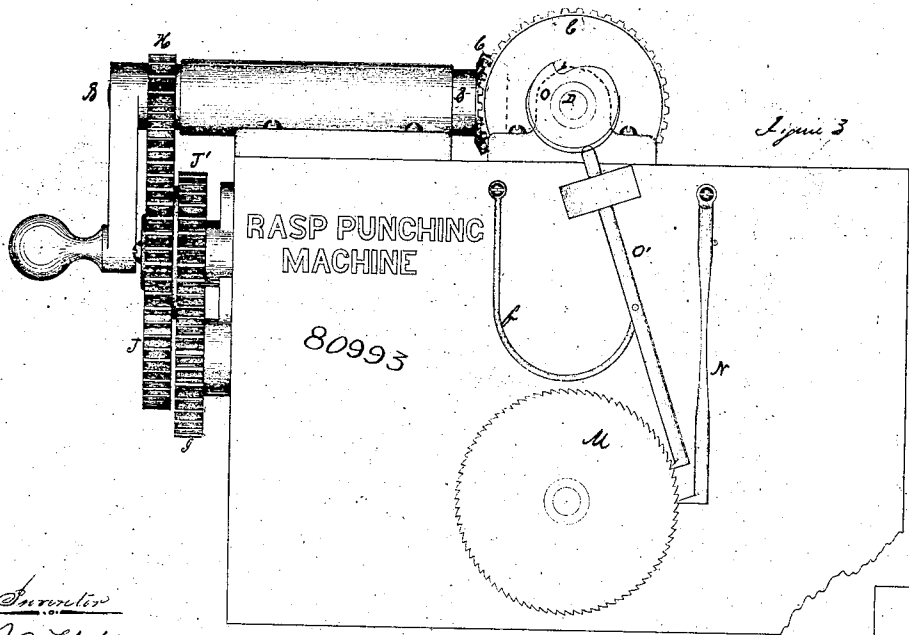


Figure 3

Inventor
W. A. Nicholas

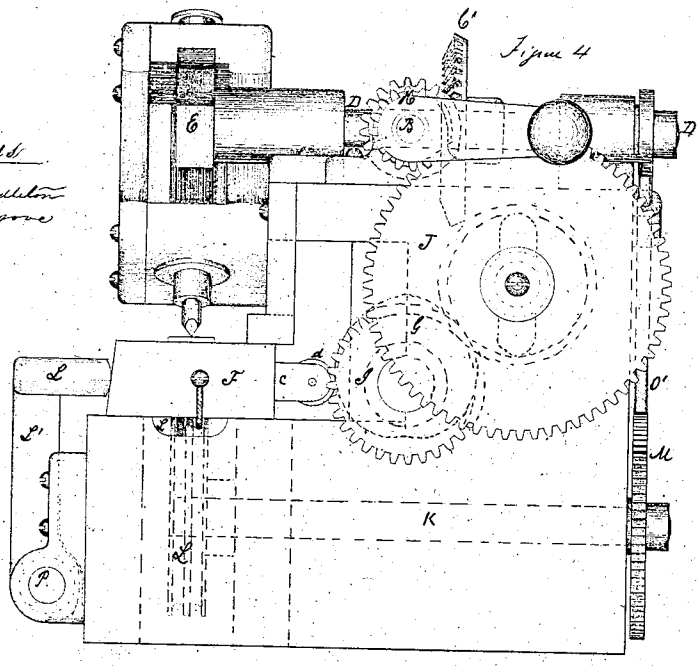


Figure 4

Witnesses
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J. W. Coopers

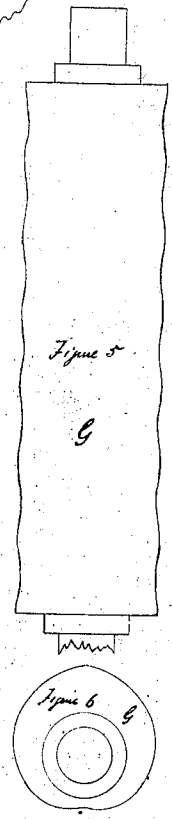


Figure 5

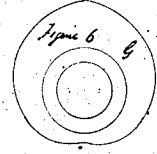


Figure 6

United States Patent Office.

WILLIAM T. NICHOLSON, OF PROVIDENCE, RHODE ISLAND.

Letters Patent No. 80,993, dated August 11, 1868.

IMPROVEMENT IN MACHINES FOR CUTTING RASPS.

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

TO ALL WHOM IT MAY CONCERN:

Be it known that I, WILLIAM T. NICHOLSON, of the city and county of Providence, in the State of Rhode Island, have invented a new and useful Improvement in Machinery for Making Rasps; and I do hereby declare that the following specification, taken in connection with the drawings making a part of the same, is a full, clear, and exact description thereof.

Figure 1, sheet 1, is a plan.

Figure 2, sheet 1, is a side view.

Figure 3, sheet 2, is the opposite side view, showing the mechanism for feeding forward the blank.

Figure 4 is an end view, a portion of the framing being removed, to show the means by which a lateral movement is given to the bed on which the blank rests.

Figures 5 and 6 are respectively longitudinal and transverse sections of a corrugated eccentric-shaft, hereafter to be referred to.

The face of a rasp differs from the face of a file in this, that the teeth of the former are not the result of diagonal cuts across the face of the blank crossing each other, but each tooth is distinct by itself, and is raised by the blow of a pointed punch-driver into the surface of the blank in a direction oblique to its plane. The several teeth are arranged in rows across the blank, but the teeth of each row alternate with the spaces between the several teeth of the rows next adjoining upon each side.

In the drawings, it will be seen that the operative parts of the machine are mounted on or are attached to a strong and suitable frame, A.

B is the driving-shaft, to which, in place of the crank shown in the drawing, a pulley and balance-wheel should be attached.

The bevelled-gear wheel C, on the driving-shaft, engages with the bevelled-gear wheel C', keyed to the transverse shaft D, and gives a rotating movement to the wild-cat or tappet-wheel E.

The punching-apparatus is shown clearly in fig. 2, and it is not unlike, in principle or in operation, the apparatus frequently employed in file-cutting machines for cutting the teeth upon a file-blank.

As is seen in the drawing, the tappets upon the wild-cat wheel E successively lift the stock which holds the punch, compressing thereby the spring *a*, which spring, when, by the revolution of the wheel E, the tappets slide off the projecting arm *b* of the cutter-stock, drives down the punch with a force due to the power of the spring.

The blank to be cut is placed upon a bed, F, and held thereon in the usual way. To this bed are given two movements, one in the direction of its length, as in an ordinary file-cutting machine, and the other in a line at right angles therewith.

The transverse movement of the file-bed is effected as follows:

Projecting from the side of the bed, midway between its two extremities, (fig. 4,) is a stud, *c*, carrying in its end a friction-roller, *d*. The face of this roller bears against the surface of the longitudinal shaft G, shown in dotted lines at fig. 4, and in section at figs. 5 and 6, following all its inequalities. This shaft is hung in bearings set in the end-frames of the machine, and has a constant rotating movement given to it by means of the toothed wheel H, on the driving-shaft, operating upon the pinion J, keyed to the axle of the shaft G, through the intermediate gears J', as shown more clearly at figs. 1 and 2.

The shaft G is set eccentrically upon its axis, (fig. 6,) and, moreover, its surface is corrugated, so that the outline of its section will show a wave or irregular line, (fig. 5.)

The file-bed F rests upon a table or suitable supports, so that it can be moved either longitudinally or sideways, when the respective machinery appropriate to the production of such movements is required to act. The file-bed will be held down sufficiently by its own weight, and by the straps or bands which are made fast to its ends, and wound around the drum, which is connected with and forms a part of the machinery for feeding the bed, in the direction of its length, underneath the punching-tool.

The mechanism for intermittently moving the file-bed in the direction of its length is arranged to operate

as will presently be seen, only at the moment that the punch has completed a row of teeth across the surface of the blank. Consequently, the first movement of the bed is in the direction of its transverse axis. As already indicated, this movement of the bed is effected by the eccentric-shaft G, which, during the first half of its revolution, forces the bed in an outward direction to the extent of the "throw" of its eccentricity. While this is being done, a row of teeth has been raised by the punch in a line across the surface of the blank. It is now proper that the file-bed should be moved forward under the punching-apparatus for a distance equal to the space intended to be had between the row of teeth just completed and the next row to be made.

It will be noticed that the wild-cat wheel E is furnished with as many tappet-faces in number as it is intended there shall be teeth cut in each of the rows across the blank, and also that, upon the extremity of the transverse shaft D, opposite to that which carries the wild-cat wheel E, (figs. 1 and 3,) is a disk-plate, O, whose outline may be of any preferred curve, and whose edge, at one point, is cut away, as shown at e, (fig. 3.) Against the edge of this disk-plate, the end of the long-arm pawl O' is made to bear by the pressure of a suitably-arranged spring, f. When the shaft D has made a complete revolution, and a full row of teeth has been punched, the disk-plate will have also been turned to a point which will allow the spring f to draw up the pawl O, and cause its end to enter the recess e, cut in the edge of the plate, in readiness at its next downward movement to engage with the next tooth of the ratchet-wheel M.

As the shaft D continues to revolve, and as the acting face of the recess e, in the disk-plate, is an inclined plane, it will happen that, simultaneously with the raising of the punch, preparatory to giving the next blow, the pawl O will be forced downward, and a movement be thereby given to the ratchet-wheel M. This ratchet-wheel is keyed to a transverse shaft, K, (shown in dotted lines, fig. 4,) which carries a drum, L, around which pass the bands, whose ends are made fast to the ends of the file-bed, and cause motion to be imparted to the bed in the direction of its length, as is well understood. A spring-dog, N, (fig. 3,) assists the pawl O' in limiting the extent of any backward movement of the ratchet-wheel M, and the mechanism which is connected therewith.

The shape which is given to the outline of the disk-plate O will determine the character of the line across the face of the blank in which the teeth will stand. Thus, if its edge be a true circle, except at the point where the recess e occurs, the several rows of teeth will stand in straight lines, but if its outline be a departure from such circle or eccentric, with its axis as shown in black, the rows of teeth will stand arranged in the arc of a circle, for the reason that the file-bed will be moved slightly, and to the extent of such eccentricity of the disk-plate during the time that a row of teeth is being punched.

A second row of teeth is now to be made, parallel with the first row, but not to be arranged in the same longitudinal lines. The necessity of the corrugations on the surface of the eccentric-shaft G is now apparent. Were its surface that of a true cylinder, the teeth of all the rows would occupy the same longitudinal lines, but, being furnished with corrugations, it becomes, in effect, a series of eccentric-wheels, no two of which, in juxtaposition, are of the same diameter, and consequently the file-bed, at the commencement of each new transverse movement, as it is moved along, occupies a new position relatively to the axis of the shaft G, and the several rows of teeth will, of necessity, stand as much out of line with each other as there is difference between the elevations and depressions in the surface of the eccentric-shaft G.

The file-bed is made to follow up the surface of the eccentric-shaft, as the latter revolves, by means of a rocking-pressure frame, (figs. 2 and 4,) which consists, in this instance, of a bar, L, placed parallel with the outer edge of the bed, and resting against it. This bar unites two upright arms, L' L'', radiating from a shaft, P, hung in bearings. Suitably-arranged springs cause this frame so constituted to press the bar L always against the file-bed, at all positions of the latter, yielding to it as it moves outward, and causing it to follow the eccentric-shaft G for the return movement.

The machinery described may be greatly modified as to its form and arrangement, and still employ the invention which is the subject of this patent; as, for example, in case a machine be so arranged that the file-bed shall be stationary, and the punching-tool be made to travel over the surface of the file-blank both transversely and longitudinally, the eccentric-shaft G could be readily and without change of principle combined with such movable tool, instead of with the bed, and the result accomplished would be the same.

I am aware that forcing the cutting-chisel by means of a reciprocating inclined plane across the blank in one direction, and returning it by means of a spring in the opposite direction, is not new, and that forcing the chisel across the blank by a rotating and eccentric-shaft in one direction, and returning the same by means of a spring in the opposite direction, as described by me, is not substantially different as a mode of operation. My invention, however, does not reside in this; but

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In combination with a file-bed and cutter, the eccentric irregular-surfaced rotating pattern-shaft G, operating through any proper devices for maintaining the file-bed or cutter in contact with such pattern-shaft, to govern the movements of the former, substantially as described.

2. The combination of the disk-plate O with the mechanism for giving movement to the file-bed in the direction of its length, substantially in the manner described, whereby the character of the lines in which the teeth shall stand across the face of the rack may be determined.

3. The combination and arrangement of the eccentric rotating pattern-shaft G, the file-bed F, and the yielding straight-edged bar L, substantially as described, for the purpose specified.

WM. T. NICHOLSON.

Witnesses: