(No Model.)

W. TUCKER.

FILE CUTTING.

No. 356,053. Patented Jan. 11, 1887.

FIG. I.

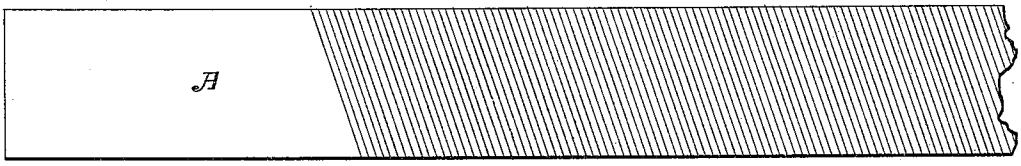


FIG. II.

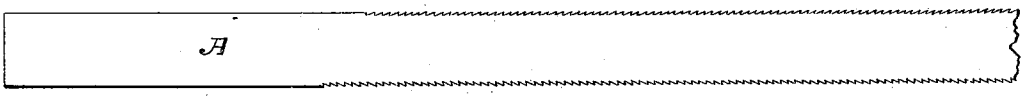


FIG. III.

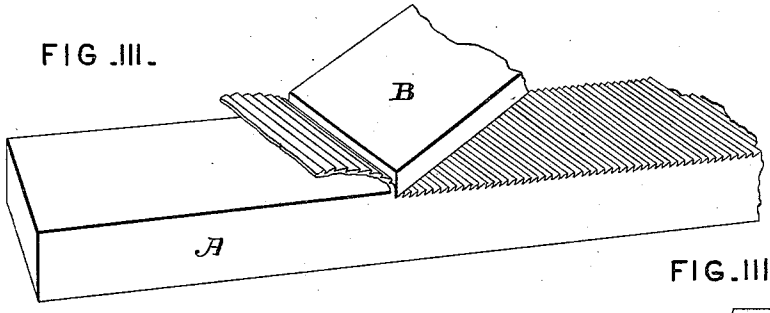


FIG. III a.

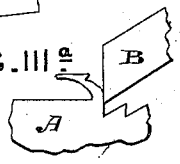


FIG. IV.

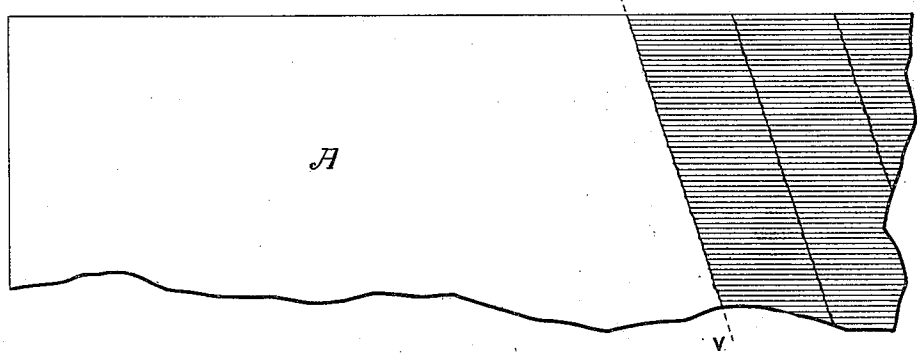
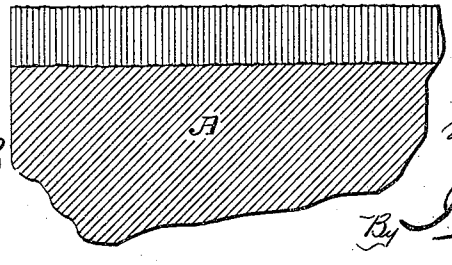


FIG. V.



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UNITED STATES PATENT OFFICE.

WILLIAM TUCKER, OF EAST BROOKFIELD, MASSACHUSETTS.

FILE-CUTTING.

SPECIFICATION forming part of Letters Patent No. 356,053, dated January 11, 1887.

Application filed October 4, 1881. Serial No. 43,174. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM TUCKER, a citizen of the United States, residing at East Brookfield, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in the Manufacture of Files, of which the following is a specification.

The object of my invention is to produce files more effective and more durable than those of common construction. To this end I cut the teeth wholly within the original surface of the blank from which the file is made, with faces perpendicular to the surface of the blank, and in such manner that slight ridges, grooves, or irregularities produced in the cutting of the teeth will extend perpendicularly to the edge of the finished tooth down the vertical face or down the inclined back, or down both the vertical face and inclined back thereof.

It is well known that the most common mode of cutting files by hand leaves the teeth with edges too thin for efficient service projecting above the original surface of the blank; the thin filmy edges of the said teeth being, moreover, turned or rolled back. The back-turned and slim filing extremity of edge is objectionable, but is unavoidable either in hand or machine cutting as commonly practiced, where the file-edge is made from the surface of the file-blank. The thin curled back edge is caused by the detrusive action of the chisel-edge in the blank, the resistance being nearly in the ratio of the square of the depth penetrated; hence the nearer the surface the metal is the more easily, and hence the more rapidly, it is thrown away from the chisel, and it becomes too thin and more or less turned back. The same effect is produced in the ordinary mode of cutting files by machinery by reason of the upsetting or rolling back of the tooth by the combined action of the cutting-chisel and the feeding of the blank. It has been attempted to obviate this difficulty by the use of a rocking or vibrating chisel; and another plan has been devised, which consists in producing file-teeth by removing the metal transversely either by rotary cutters or by the use of gravers cutting across the blank.

By my improved mode of operation I am enabled to produce a perfectly symmetrical tooth with the desired vertical grooves or ridges and without any back-turned filmy edge. To this end I employ a chisel reciprocating in a plane parallel with the back of the desired tooth, or nearly so, and a continuous or intermittent feed, by which a new portion of the blank is presented to the chisel at each descent of the latter, the relative movement being such that each descent of the chisel forms the back of one tooth and the face of the next, cutting into and through the vertical face of the tooth last formed, removing the surplus metal, and leaving the edge of the tooth uniform in height with its predecessors.

The cutting-chisel is formed with longitudinal ridges or grooves on the front or back, or both, to produce corresponding serrations and grooves in the edge and face or back of the tooth. If the front of chisel be ridged, of necessity the edge of the chisel will also be ridged, and correspondingly the face and edge of the file-tooth will be ridged, and if the back of the chisel be ridged it will also of necessity cause the edge of the chisel to be ridged, and correspondingly the back and edge of file-tooth will be ridged, and if both back and front of chisel be ridged, then of course its edge is ridged, and also the face, back, and edge of the file-tooth are correspondingly ridged. These grooves or ridges are made finer or coarser by fine or coarse emery or grit wheels, or in any other manner, as with a graver.

It is a common practice with file-makers to grind their file-blanks coarsely to cause ridges in their surface, so the edge will partake of the furred surface and become ragged. They sometimes scratch the blank surface with a file or rasp for the same purpose. A polished surface would not make a good file; but what they do by grinding the blank surface rough, or roughening it by other means, I do by roughening the chisel, which accomplishes what they aim to do, but in a different and superior manner, and I also improve the form of tooth, while maintaining at the same time the slight ridges or grooves sought for by file-makers.

In order that the invention may be better understood, I will proceed to describe it with reference to the accompanying drawings, in which—

Figure I is a plan view of a file-blank partially cut in accordance with my invention. Fig. II is a side elevation of the same. Fig. III is a diagram in perspective, illustrating the mode of operation. Fig. III[a] is a diagram in side elevation, showing the position in which the chisel commences to cut at each stroke. Fig. IV is a plan of a portion of a file, on an enlarged scale, illustrating the form of the teeth. Fig. V is a transverse section on the line V V, Fig. IV.

A represents a steel blank, suitably forged, but not necessarily ground to a precisely even surface, as in the usual mode of manufacturing files, for the reason that my mode of operation produces teeth of precisely uniform height with reference to the feed-table on which the blank is supported. The chisel B, being forced down by suitable means, cuts the first tooth at the point or forward end of the blank, forcing out a chip of metal, and in its next descent it cuts into the face of the tooth just formed underneath the turned-up chip, forming a new chip in continuation of the first and producing the back of a tooth, after which the work proceeds as before, the chisel rolling off and removing from the face of the file as the work progresses a more or less continuous chip, forming uniform teeth without any projection beyond the original surface of the blank, and, moreover, with vertical corrugations, grooves, or ridges in the faces of the teeth, produced by similar grooves in the edge of the chisel, which are formed therein in the grinding of the latter, or by other means. This operation is illustrated in Fig. III, and the form of the teeth with grooved vertical faces is represented in Figs. IV and V. The more or less serrated edge of the cutting-chisel produces corresponding serrations in the extreme edge of each tooth of the file, the said serrations extending down the face of the tooth perpendicularly to the cutting-edge. The effect of these serrations and grooves is to impart great sharpness to the file, which is continued as the tooth wears away to a much greater and more effective degree than is the case with ordinary files, and the file is, moreover, very durable by reason of the avoidance of the back-turned filmy edges which exist in files of ordinary construction.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. As a new article of manufacture, a file having teeth of the general form and inclination of rip-saw teeth—that is to say, with oblique backs and vertical faces, and in said vertical faces or oblique backs grooves or ridges extending perpendicularly to the cutting-edge of each tooth.

2. The mode or process herein described for making files, the same consisting in feeding a suitable blank to a chisel reciprocated in a plane inclined to the surface of the blank, said chisel having a serrated edge to produce grooves in the edge and face or back of the tooth, and being operated relatively to the blank and the feed mechanism in such wise that at each successive downward stroke a cut will be made obliquely through the vertical face of the tooth last formed, removing the surplus metal and producing serrated teeth, all as herein set forth.

WILLIAM TUCKER.

Witnesses:
JAMES GOODRICH,
JOSIAH HOBBS.