

UNITED STATES PATENT OFFICE.

CHARLES ADOLPHE CLAVEL, OF PARIS, FRANCE.

IMPROVED MODE OF HARDENING AND REPAIRING FILES AND RASPS.

Specification forming part of Letters Patent No. 43,658, dated July 26, 1864.

To all whom it may concern:

Be it known that I, CHARLES ADOLPHE CLAVEL, of Paris, in the Empire of France, have invented a new and Improved Mode of Repairing Worn-Out Files and Rasps and of Hardening New Ones; and I do hereby declare that the following is a full and exact description thereof.

The process above described has for its object repairing or recutting worn-out files and rasps and rendering them again fit for use, and hardening new files and rasps.

It consists, after having removed from their surface any foreign adherent matters, in immersing the files and rasps in a bath formed of a mixture of sulphuric and nitric acids and water, the most efficacious proportions of which mixture are one part of nitric acid to three parts of sulphuric acid and seven parts of water, by measure. The only operation for new files and rasps is an immersion for a few seconds in this mixture and the washings and neutralization of the effects of the acid, as will be hereinafter described. For the worn-out files and rasps the immersion lasts from about ten seconds to about five minutes, according to the more or less worn state of the file or rasp, their size, and, above all, their fineness or coarseness and hardness of metal, the sharpening or repairing being much more rapid for a fine soft-grained file than for a large-cut hard-grained file, which may require even a longer immersion than that above named. As the solution loses its strength by combining with the iron fresh doses of acid must be added to it in the proportions above indicated. The rasps or files are next washed in clean water, passed through lime-water, dried in stoves or by other means, impregnated with a mixture of oil and turpentine by means of a brush, and lastly brushed with coke-dust.

When it is necessary to protect from the action of the acids certain parts of the file or rasp which are more worn away or lower than the rest a mixture of sealing-wax and fat-oil melted together is applied to these parts at a temperature of 30° centigrade, (63.6° Fahrenheit,) or a varnish of gum-lac or other substance capable of resisting the action of the acids. The immersion of the files or rasps in the acid bath should only take place thirty or forty hours after this application. When, on the contrary, it is wished to cut away and level certain parts of the file or rasp which project a mixture of a hundred parts of nitric acid with fifty parts of sulphuric acid should be applied as many times as it may be necessary, while raising the tool at one end and inclining it toward the side, so that the acids may run into the grooves and deepen them without blunting the teeth.

Files and rasps may by the above means be sharpened several times and give each time a result at least equal, and in many instances superior, to new files and rasps.

Having now fully described my said invention and the manner in which it is to be performed, what I claim, and wish to secure by Letters Patent of the United States, is—

The combination or mixture, in the above proportions, of sulphuric and nitric acids diluted with water and employed as above for repairing or recutting worn-out rasps and files and rendering them again fit for use, and for hardening the surfaces of new files and rasps, substantially as above described.

CHARLES ADOLPHE CLAVEL.

Witnesses:

H. BONNEVILLE,
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