Slow-Speed Sharpening

Lessening the chance of burning your tools

by Mark White

To reduce the risk of friction-caused heat drawing the temper of my tools, I designed a simple-to-make sharpening system that incorporates a vertical shaft turning slower than 300 RPM. The horizontal wheel, which allows flat grinding rather than hollow, may be a conventional grindstone or a flat wooden plate covered with an abrasive disc. For stropping, I use a crowned wooden disc covered with leather and charged with an abrasive compound.

The heart of the system, shown below left, is a laminated disc bolted to a standard pipe flange, which is in turn screwed to a short length of 1¼-in. pipe. The pipe turns in two bearings made of 4-in. by 4-in. by 9-in. chunks of hickory. I bored the holes for the bearings with an adjustable bit set to bore about 1/16 in. larger than the pipe's diameter, to compensate for swelling of the block and tightening of the hole when oiled. If you drill oversize and experience wobble in the shaft, you can cant the blocks until they bear upon the shaft. The hole in the upper block should pass entirely through it. The lower block should be drilled 1 in. short of going through, so that the shaft has a full inch of wood to rest on as it turns.

To make the pulley, I bandsawed two 14-in. discs and one 12-in. disc from ⅝-in. plywood. I marked and drilled the centers of these discs to take a ⅜-in. bolt and used these center holes to position the discs during glue-up, sandwiching the smaller disc between the two larger ones.

Next I lag-bolted the bearing blocks to the front edge of my workbench, lubricated them with chainsaw oil and inserted the pipe with pipe flange. I positioned the laminated pulley on top of the flange, and marked, drilled and bolted it in place.

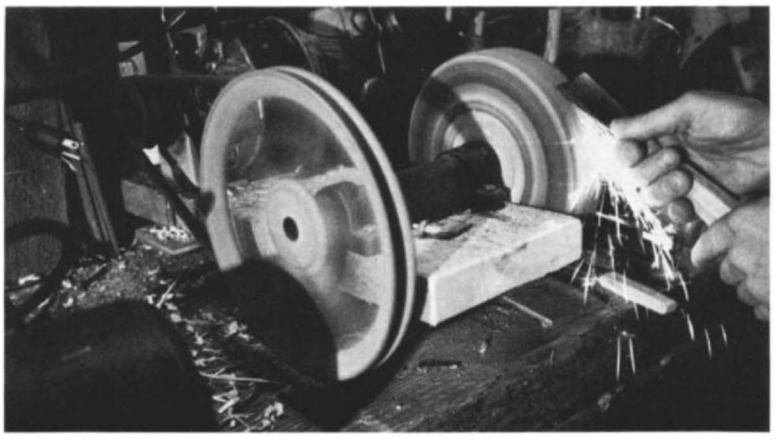
The vertical-shaft motor I took from a junked washing machine. I mounted the motor on the workbench, hooked it up to the pulley and let it run for about 30 minutes in order to wear in the hickory bearings. The face of the flange did not run perpendicular to the axis of rotation, but a bit of fiddling with a couple of cardboard shims between the pulley and the flange leveled the disc.

A conventional grindstone could be mounted right on the pulley, but I chose to use my system for stropping. I stacked and glued a few more plywood discs to the top of the pulley, switched on the motor and turned the head with a sharp gouge to a rounded, conical shape. (Leather yields under pressure, and if the leather were applied to a flat surface, a tool pressed to the leather would sink in and the tool bevel would become convex.) Sanding completed the shaping of the head, and a heavy coat of paint sealed the wood. From a local leather shop I picked up a piece of 3/16-in. thick shoe-sole leather, soaked it in hot water and molded it in place over the head. A nut and washer hold the leather in the center, and a ring of aluminum tacks holds down the perimeter. The leather can be charged with various grits of aluminum-oxide buffing compound; the distance you hold the tool from the center of the disc also affects the speed of the sharpening action. Because the head is crowned slightly, wide-edge tools are easier to sharpen. Attention can be concentrated on a small section of the edge, while the ends clear the perimeter and hub of the wheel. Always hold the tool on the plate so the rotation is away from the cutting edge; otherwise the tool can grab and cut the leather.

The system can be varied to incorporate a large flexible sanding disc which, if run at 800 RPM would be useful for sharpening axes, adzes and drawknives. A reversible motor would be useful for knives and other two-edge tools. □

Mark White teaches woodworking in Kodiak, Alaska.

White's horizontal sharpening system, which rotates at only 300 RPM, can be fit with a grindstone, an abrasive disc or a leather-covered stropping wheel. An old washing-machine motor provides power.



Another of White's slow-speed sharpening arrangements has a 2-in. by 9-in. aluminum-oxide wheel on a 3¼-in, mandrel powered by a 1,725-RPM motor. A 3-in. pulley at the motor and a 10-in. pulley at the mandrel yield a grindstone speed of about 500 RPM, fast enough to remove metal with reduced risk of burning the tool.

Photos: Mark White