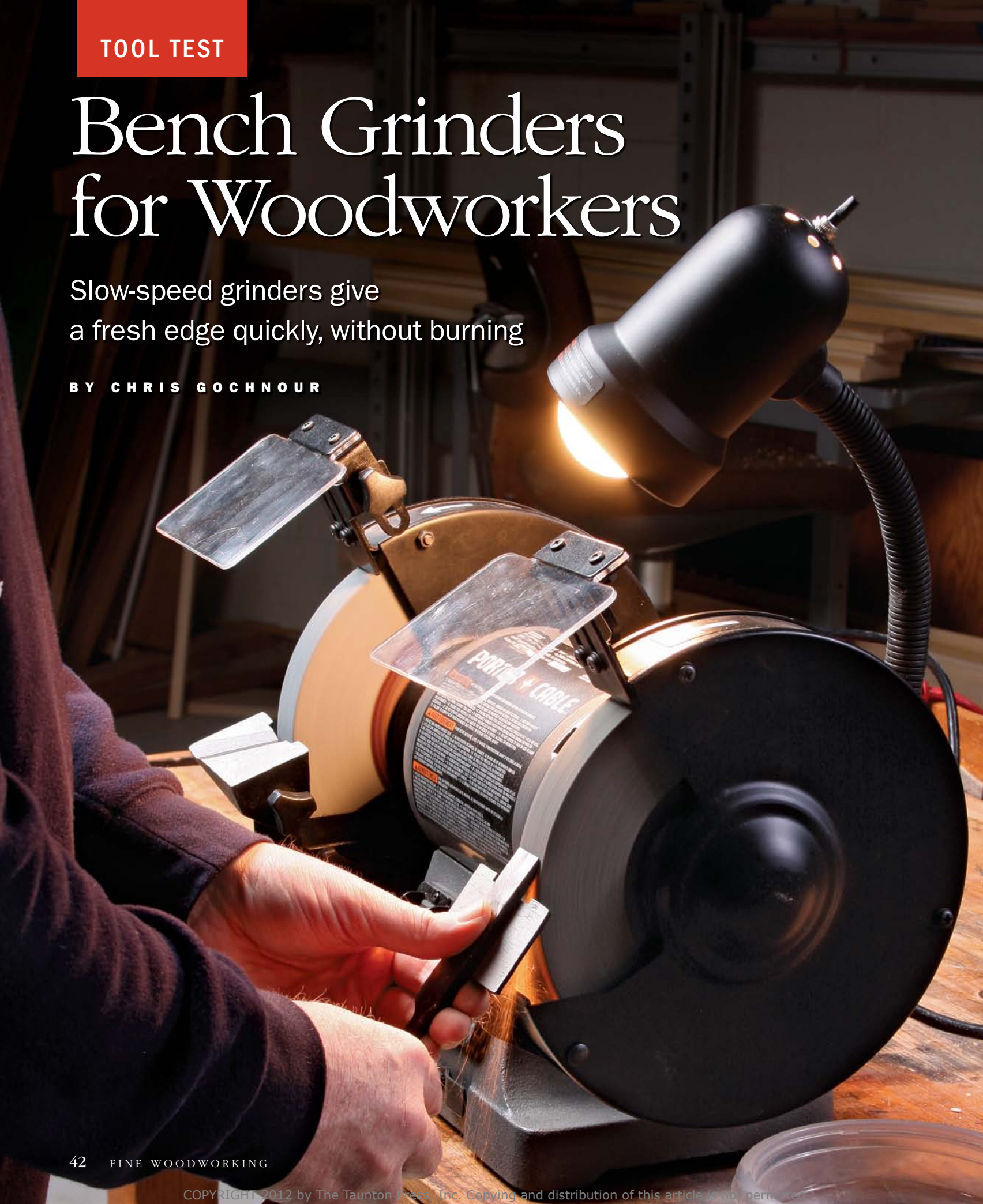


Bench Grinders for Woodworkers

Slow-speed grinders give
a fresh edge quickly, without burning

BY CHRIS GOCHNOUR



Tool rests fall short

Over the years I have reviewed many wonderful hand tools for *Fine Woodworking*, from handplanes to chisels to spokeshaves to backsaws. So when they asked me to take a look at electric grinders, I was a bit befuddled and hesitant.

It didn't take long to reconsider. After all, grinders are a vital tool in the woodshop, for shaping plane irons, chisels, gouges, and knives before they are honed to a polished edge. They also excel at reshaping tools, such as scratch stocks and scrapers, and creating skew chisels for dovetailing.

For this review, we narrowed the field to 8-in. variable- or slow-speed machines. I prefer 8-in. models. The shallow hollow leaves more material behind the bevel. We capped the price at \$200, a point we thought made sense for such a one-dimensional tool. That left us with five grinders, from Craftsman, General International, Penn State Industries, Porter-Cable, and Woodcraft.

To evaluate the machines, I first considered the usefulness of the stock tool rest, the most important feature. Then I judged the overall quality of the wheels, checking them for roundness and for runout. Finally, I evaluated other features and accessories, and then judged the machines on how well they performed the basic tasks of shaping plane irons and bench chisels.

Are the tool rests good enough?

A tool rest should be sized to accommodate wide plane blades as well as chisels, and should move in and out to ensure that the platform stays within $\frac{1}{8}$ in. of the wheel for safety. The platform needs to be flat so that tools slide easily on it. It also needs to be adjustable to handle different sharpening angles, and the angle should remain fixed as you grind. Unfortunately, woodworkers are not the primary market for these machines, so most of the tool rests fall short.

The deal with wheels

Years ago, when you purchased a grinder you did so knowing that you would immediately replace the hard, hot-running silicon-carbide wheels on it with softer wheels. Not anymore. Each grinder I reviewed is equipped with soft but long-wearing aluminum-oxide



USABLE



Big and adjustable. The Craftsman (shown here) has the biggest tool-rest platforms. Both it and the Porter-Cable are easily adjusted. Unfortunately, each one has detents in the adjustment mechanism that limit the angle settings. A simple fix is to place a washer spacer over the detents (above).



NOT USABLE



Made for metalworkers? Most of the tool rests were subpar, including one on the Porter-Cable (left), which has a trough for drill bits raking across the platform that won't let you grind chisels accurately. Platforms on the Penn State (right) and General International can't be angled at all.



BEST FIX



Easy upgrades. The best solution to a faulty tool rest is to invest in an aftermarket model, such as the Veritas (left, \$50), which took Best Overall and Best Value in a head-to-head comparison (FWW #174). Another option is the Wolverine jig (above, \$88), which comes with both a flat rest and a clever arm for turning tools.

8-in. bench grinders, head to head

While their wheels are state-of-the-art, all of the grinders in this group have problems with the other critical part of the machine: the tool rests. Because of that, we decided to award only a Best Value, to the Porter-Cable.



PORTER-CABLE PCB575BG

Street price: \$119

Source: Lowes, lowes.com

Speed: Variable,
from 2,000 to 3,400 rpm

Wheels: 1 in. wide; 120 grit, 36 grit,

Runout: 0.005 in. (after flange adjustment)

Tool rest: 2¾ in. by 1¾ in.

The Porter-Cable has one usable tool rest that's ground flat; the other has a drill trough cast into the platform, making it useless for narrow chisels. That's too bad because the rests are the easiest of the group to adjust via thumbscrews. The only inhibiting factor in the angle adjustments is the detents in the mechanism that limit the settings; I had to override them with a washer spacer (top right photo, p. 43). Once set, the platforms held their settings. The grinder ran with very little vibration, after adjusting the flanges to correct wheel wobble. The Porter-Cable comes with a diamond wheel dresser and a handy work light. At \$120, you'll have some money left over to replace one of the tool rests with an excellent aftermarket version (see p. 43).

wheels. The wheels run cooler and are friable, meaning they break down in use, exposing new sharp edges. Overall, the quality of the wheels was good, though each machine required some wheel work (see opposite page). Most grinders in this review come with a coarse wheel (34 or 36 grit) and either a medium (60 grit) or fine (120 grit) wheel. For grinding tool steel, you are better off with a coarse or medium-grit wheel.

Speed changes are rare, but it's nice to have the option

When spinning at the same rpm, 8-in. wheels generate higher surface speeds than 6-in. wheels. That's an advantage and a curse. The bigger wheel removes metal quickly, but the by-product of that increased speed is increased heat. With the high-carbon tool steel in plane irons and chisel blades, excessive heat can ruin the temper and hardness of the cutting edge. That's why you want



CRAFTSMAN 21162

Street price: \$170

Source: craftsman.com

Speed: Variable, from 1,745 to 3,450 rpm

Wheels: 1 in. wide; 60-grit, brass wire

Runout: 0.005 in.

Tool rest: 4¾ in. by 1¾ in.

This grinder has the biggest tool-rest platforms of all the grinders, and they were flat. Angle adjustments were easy to make via a thumbscrew, but detents in the mechanism had to be overridden by a washer spacer (see p. 43). Once set, the platforms held their settings. But depth adjustments, which are needed whenever the angle is changed, require a wrench, which is a hassle. The grinder was the only one in the group that did not experience severe runout, so no flange adjustment (opposite page) was needed. But the machine's brass wire wheel is essentially useless for woodworkers and caused a lot of vibration. The work light comes in handy.

slow speed with 8-in. machines, which I use for most sharpening jobs. But having a higher speed option comes in handy for rapid stock removal, say if I were blunting the tip of a chisel to make a skew. High speed is also preferable for dressing the wheels.

Best of the bunch

While testing the machines, I discovered that none is perfect. Each has major flaws with its tool rests, and in all cases I'd recommend replacing at least one of the stock rests with an aftermarket one. Because of that fatal flaw, we decided to choose only a Best Value, the Porter-Cable. One of its tool rests was usable, and it comes with a dresser and work light. It also was the least expensive, making the cost of an aftermarket tool rest easier to swallow. □

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GENERAL INT'L 15-825 M1

Street price: \$190
Source: toolking.com
Speed: 1,725 rpm
Wheels: ¾ in. wide; 60 grit, 34 grit
Runout: 0.014 in. (after flange adjustment)
Tool rest: 2⅝ in. by 1¼ in.

The General International grinder is the only machine with a ¾-in.-wide wheel. The tool rests can move in or out by loosening and tightening two bolts with a wrench, but they are cast roughly and can't be angled in any way, making them almost useless. On the other hand, the General is a very smooth-running grinder, with very little vibration (after adjusting the flange).



PENN STATE INDUSTRIES GRIND2X

Street price: \$160
Source: pennstateind.com
Speed: 1,720 or 3,450 rpm
Wheels: 1 in. wide; 120 grit, 60 grit
Runout: 0.007 in.
Tool rest: 2⅝ in. by 1¼ in.

Like those on the General International, the tool rests on the Grind2X are not a bright spot. Each is a one-piece casting that can move in and out, but lacks an adjustable platform (one platform also has a drill bit trough cast into it). The platforms are relatively flat, but because they can't be angled, grinding a chisel or plane iron evenly is a big challenge. The plastic shields had a hard time staying put while the machine was running.



WOODCRAFT 150780

Street price: \$125
Source: woodcraft.com
Speed: 1,725 rpm
Wheels: 1 in. wide; 120 grit, 60 grit
Runout: 0.006 in. (after flange adjustment)
Tool rest: 2⅝ in. by 1¼ in.

The Woodcraft grinder has two-piece tool rests with relatively flat but small platforms. The rests and platforms can be adjusted, but the job requires a wrench, which is a hassle. But once dialed in, the tool rests held their settings well. The biggest problem with the Woodcraft in this review is that it vibrated a lot, even after I corrected the wheels for runout and dressed them.

Before you grind

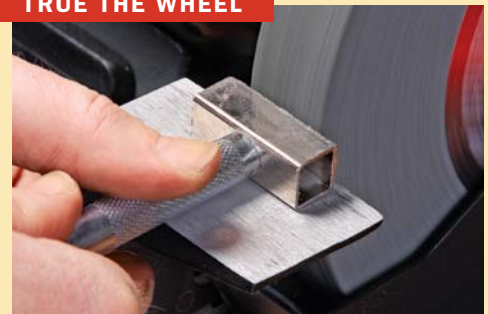
A grinder will give you fits if it's vibrating excessively. Sometimes the vibration is caused by the grinder not being mounted securely. But often vibration can be traced to the wheels. A common cause is runout, a situation in which a wheel wobbles from side to side. Runout often is caused by the pressed steel flanges, which hold the wheel on the shaft, not allowing the wheel to run true. Vibration also can be caused by an out-of-round wheel. Fortunately, both problems have simple solutions. If neither fix works, the shafts of the machine could be bent and you should return it.

WIPE OUT THE WOBBLE

The flange fix. Mark a reference line on the inside flange (top), in a spot you can see while the wheel is on. Then mark the outer flange and place it on the shaft (bottom). Spin the wheel by hand, checking for runout by eye or with a dial indicator. If you find it, rotate the outer flange about an eighth of a turn, and re-check. Repeat until the runout has been minimized.



TRUE THE WHEEL



Get dressed. A diamond wheel dresser not only trues the wheel, but it also exposes fresh abrasives, making the wheel run cooler and more efficiently.

Online Extra

For a free video on how to grind perfect bevels with no burning, go to FineWoodworking.com/extras.