

Notes from the Shopsmith Woodworking Academy

Clean Cuts — PART V – Sharpening Jointer, Molder & Shaper Knives

The Jointer, Molder and Shaper share a common capability; they're all *milling* tools the average woodworker can use to shape and condition the edges and surfaces of workpieces.

However, they also share a common problem — rapid edge dulling. All of them use triple element cutters. As a result, whenever you use one of these tools, each edge is brought into contact with the stock many, many times as it rotates at high speeds. And, as you might expect, with only three edges, they tend to dull quickly and must be kept as sharp as possible to achieve the smoothest edges.

To refresh your memory once again, the safest operations and best results come from using SHARP tools. Dull edges not only have an adverse effect on your results, they can also be very dangerous when in use.



TO HONE OR TO GRIND ? – THIS IS THE QUESTION

The answer to this question is really quite simple. If your cutter is dull and the edges are free of nicks, the best solution is honing. In other words, "If it ain't broke, don't fix it!" Remember, the process of sharpening tools always results in the removal of steel from the edges and you can only sharpen the edges of cutting tools so many times before you eventually run out of material to remove. Therefore, edges should only be ground to eliminate nicks or solve other serious problems...grinding should be held to a minimum.

Actually, it's not difficult to get these tools good and sharp using a set of bench oilstones. Honing Jointer Knives is often no more than touching them up while they're still mounted on the machine. If they're nicked and need to be re-ground, we'll tell you how to do this in a minute.

Shaper and Molding Knives can also be honed quite easily on an oilstone. However, regrinding Shaper and Molding Knives to remove deep nicks is a task that's best reserved for a professional, since each of the three cutting edges must be ground to match perfectly in order to produce the best cuts without vibrations.

It's important to note that the honing process for all three types of knives requires a well-dressed, flattened stone and enough lubricant to keep the stone from loading-up with swarf during sharpening. While you might think about using a waterstone to hone Shaper and Molding Knives, keep in mind that the water required for lubricating such stones will rust your Jointer table and mechanisms. For this reason, it's



best to use Oil Stones such as a Hard Arkansas Stone for this on-the-Jointer process. So, let's start with honing the Jointer Knives.

The Jointer is, in itself, a multi-purpose tool used to prepare straight, square edges on boards; to surface the faces of narrow stock; and to create tapers and rabbets. The smoothness of the Jointer cut depends on the speed of the Knives or Cutterhead, the rate of feed, the proper setup...and, of course, the sharpness of your Jointer Knives.

Honing the Knives on the Jointer

If your Jointer Knives become dull or *slightly* nicked, they may be honed without removing them from your Jointer's Cutterhead.

CAUTION: Before performing any maintenance on your Jointer, be certain the power source is disconnected, not merely turned off!

Start by removing the guard and fence so you can remove the built-up pitch from the Knives with paint thinner or Saw Blade Cleaner.

IMPORTANT: Do not allow Saw Blade Cleaner to come into contact with bearings.

Next, lower the infeed table about 1/8" so that the bevels of the cutting edges are exactly level with the infeed table surface. Use a straightedge resting on a piece of waxed paper as a guide (See Fig. 1).

Wrap a well-dressed, flattened oilstone (a medium India is best) in waxed paper, leaving about 1" of the end of the stone exposed. Place the wrapped end of the stone on the infeed table so the exposed part of the stone rests precisely on the bevel of one of the Knives. **No part of the exposed stone should contact the infeed table surface.**

Hold the Cutterhead drive shaft with your left hand and move the stone across the Knife with your right hand. Take long, even strokes from side-to-side (See Fig. 2). Count the strokes so that you can hone all three Knives evenly. How many strokes should you take? Usually 15 to 25 is enough. If you need more strokes, it usually means that you're using the oilstone incorrectly or that your stone is not properly dressed. It might also tell you that you're waiting too long between honings.

Repeat this process for the other two Knives. Clean your stone frequently with Honing Oil. Squirt a generous amount onto the stone, rub it in to loosen the swarf and wipe it clean with a soft rag. Touch up the burr on the Knives with a few light strokes using a Hard Arkansas stone (See Fig. 3). Remember...take no more than a few strokes.

Prior to using your Jointer after honing the Knives, check the height of the cutting edge of each Knife with a straightedge, as described in your Jointer Owner's Manual.

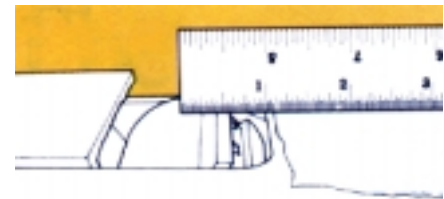


Fig. 1: Using a straightedge over a piece of waxed paper as a guide, lower the infeed table until it is level with the bevel of the cutting edge.



Fig. 2: Wrap an oilstone in waxed paper, leaving one end exposed. Place it on the infeed table so that the exposed part of the stone rests on the bevel of one of the knives.

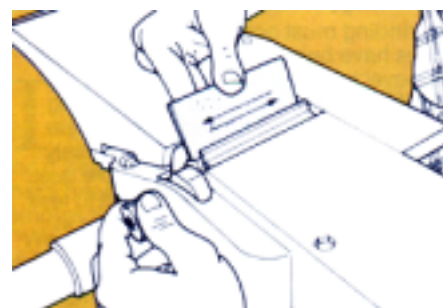


Fig. 3: To finish honing each jointer knife, stroke the front or face of the cutting edge with a hard Arkansas oilstone.

Regrinding Jointer Knives

Regrinding must occur when Jointer Knife edges have been chipped or damaged...or the bevel has become rounded after repeated honings. Since the Knife leveling screws in the Shopsmith Jointer eliminate the need for match-grinding each Knife to precisely the same width, this is a fairly simple task.

Knives that have been reground to less than 11/16" wide **should not be used** in your Shopsmith Jointer, since the locking wedges will not be able to hold them securely in the revolving head. Furthermore, Shopsmith Jointers require **Shopsmith** Knives. Other brands just won't seat properly in the Cutterhead and can pose the danger of Knives flying out of the machine at tremendous speed.

As a point of information, Shopsmith Jointer Knives are factory ground with a straight bevel at 45-degrees. This is a multipurpose cutting angle that will produce smooth cuts at a variety of speeds in both hard and soft woods. The straight bevel (rather than a hollow-ground bevel typically produced by a grinding wheel) offers more steel backing up the cutting edge. This helps to produce a longer-lasting cutting edge.

Depending on the materials you work with, you may wish to change this angle slightly. If you work entirely with soft woods, 47 to 48-degrees will give a smooth cut. If you work entirely with hard woods, try grinding your knives at 42 to 43-degrees.

Stationary Grinder or Disc Sander?

If you use a Grinding Wheel to regrind your Knives, it's important that the wheel be very well-dressed beforehand. A rounded-over or clogged-up wheel cannot produce a straight, true edge. Keep in mind that using a Grinding Wheel on Jointer Knives can be a complex and dangerous process. First, Jointer Knives are narrow and difficult to hold safely during grinding. And secondly, match-grinding all three Knives without a special holding Jig can be practically impossible for all but the most skilled tool grinders.

For these reasons, we recommend that you not attempt this and rather, regrind your Jointer Knives using the Shopsmith Disc Sander setup. We offer you both a fast, easy way...and a slightly more involved, though less expensive way to do this, based on a built-it-yourself Sharpening Jig.

No matter which way you decide to go, start by disconnecting your MARK V and Jointer from the power source, then remove the Knives.

The fast, easy way

The best regrinding solution for your Shopsmith Jointer Knives is provided by Shopsmith's Planer/Jointer Knife Sharpener, used in conjunction with our Conical Sanding Disc (See Fig. 4). The Sharpener attachment has been carefully engineered to hold your Jointer or Planer Knives at precisely the right angle during sharpening. You'll get a simple, fail-safe Sharpening Attachment, with easy-to-follow, step-by-step instructions.

Just set up your MARK V in Disc Sanding mode with the Conical Sanding Disc and 150-grit Sandpaper. Then, simply follow the instructions that are included with the Sharpener.

The build-it-yourself jig

Start by building the jig shown in Figure 5. Next, set up your MARK V in Disc Sander mode with 100 to 150-grit sandpa-

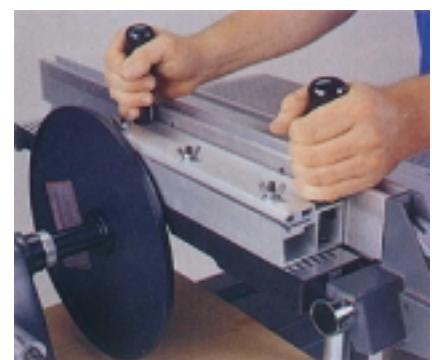


Fig. 4: Use Shopsmith's Planer/Jointer Knife Sharpener with the Conical Sanding Disc to sharpen your Jointer or Planer Knives.

per. Lock the Worktable and Sanding Disc 1/8" apart. Offset the Rip Fence about 1/16" to the right by turning the Allen setscrew in the right side of the Rip Fence Base (See your MARK V Owner's Manual or the Disc Sanding section of Shopsmith's *Power Tool Woodworking for Everyone* textbook for detailed instructions.)

Clamp the first Knife into the Jig by inserting it into the saw kerf and tightening the two wood screws. Make certain that the base of the Knife sits flat on the bottom of the saw kerf. Failure to do this will result in the blade being reground at an improper angle.

Next, adjust the Rip Fence to hold the jig so the Knife just barely touches the Sanding Disc on the downswing side, near the front edge of your MARK V's Worktable. Lock the Rip Fence into position. Cover the MARK V's Way Tubes to protect them from flying bits of metal and abrasive particles.

Wear Safety Glasses or a Protective Face Shield to protect your eyes from flying debris. At SLOW speed, feed the jig (with the Knife inserted) towards the Disc...starting at the back of the Worktable and working your way forward (See Fig. 6). Remember...the Sanding Disc should contact the Knife only slightly...and only at the outfeed (downswing) edge of the Worktable.

Always move the jig slowly...taking light passes...yet not so slowly that the metal begins to heat-up. If the metal starts to turn blue, it will lose its temper and therefore, its ability to hold an edge.

If you determine that the Knives still need more grinding after making several passes without adjusting the Disc, place a strip of paper between the jig and your Rip Fence and repeat the above process. This technique will allow you to advance the Knife very precisely and minutely towards the rotating Disc. Up to three strips of paper can be used at one time, although it's most likely that only one strip of paper will be required.

IMPORTANT: When performing this operation...whether using Shopsmith's Planer/Jointer Knife Sharpener or this shop-made jig...start with your nicked Knives and be sure to count the number of passes you make over the Sanding Disc. All Knives should receive the same number of passes in order to maintain proper Cutterhead balance. If you remove more material from one Knife than from another, an out-of-balance situation will exist, resulting in bothersome machine vibrations.

Check your Knife's edge frequently to be sure you've removed all of the nicks. Use a straight-edge to ensure that the Knife's edge is straight and true. Remove the Knife from the jig and hone it with a medium grit India (or similar) stone. Follow-up with a Hard Arkansas stone to remove any burrs.

After regrounding all of the Knives, install them in the Cutterhead according to the procedures outlined in your Jointer Owner's Manual.

Shaper & Molder Knives

Like the Jointer, most Shaper Cutters and Molder Heads use three cutting edges...and because of the way they're ground, it's relatively simple to keep them sharp without changing their profiles.

Start by using a *flat* stone such as a Medium or Fine India or a waterstone. Use plenty of

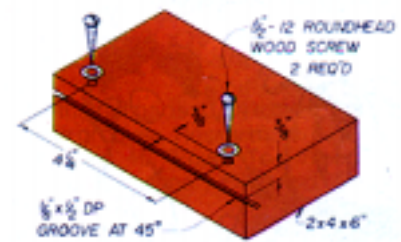


Fig. 5: A jig to reground a 45-degree bevel in Jointer Knives with the Shopsmith Disc Sander. Cut a 1/8" saw kerf at a 45-degree angle in a scrap piece of 2" x 4". Add two wood screws with washers to clamp the Knife in the kerf.

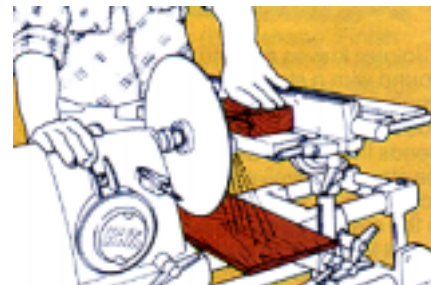


Fig. 6: Using offset fence technique, grind Knives to remove nicks.

lubricant (oil or water) to keep the stone from clogging-up with swarf.

Hone the faces of the Cutters often, with just a few strokes on each. Again, be sure to count the strokes as you go to be certain you're honing all three edges equally. Should a burr form on the profile, use a Hard Arkansas slipstone to remove it with just a few light strokes.

While you may want to hone the entire surface of the Molder Knife's face side on the stone, It's important to remember that repeated honings will reduce the thickness of the Knife, potentially allowing the Knife to become loose in the Cutterhead. For this reason, you should hone only the profiled section that extends outside the Molding Head (See Fig. 7).

When honing the three-wing Shaper Cutters, use the well-dressed (sharp, 90-degree) edge of a medium or fine grit oilstone or waterstone. With all profiles (especially the ogee), use care to hone the entire profile (See Fig. 8). Again, count the number of strokes and be sure to use the same number on each cutting edge. Remove the burr with just a few light strokes of a Hard Arkansas stone.

Final thoughts

Jointer, Shaper and Molder Knives should always be as sharp as possible. Check them frequently by carefully drawing the cutting edge over your thumbnail. They should grab slightly and leave a light track. A Magnifying Lamp will help you spot small irregularities in your cutting edges.

Sharpening these tools helps you grow in your respect for them. As with all power wood-working tools, you should have a healthy respect for the danger they can pose, if not properly cared-for.

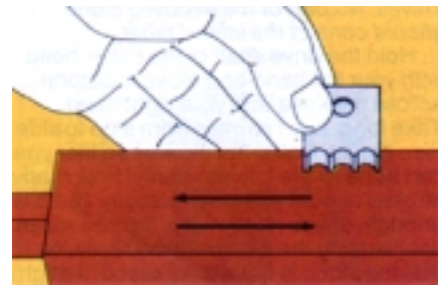


Fig. 7: Honing a Molding Knife. Hone only the profiled section of the Knife. Use the same number of strokes on each knife in the set.



Fig. 8: Use the edge of a stone to hone the entire face of Shaper Cutters.