Who's Got the Best Riving Knife?

Finally, this safety feature is required on tablesaws, but manufacturers approach it differently

BY ROLAND JOHNSON

What's so special about these saws?

New tablesaws are outfitted with interchangeable riving-knife systems (high- and low-profile) that are better at protecting you from kickback than the splitters of old. The high-profile system helps protect against both kickback and hand-to-blade contact. For certain operations, when the high-profile knife can't be used, the low-profile riving knife can be substituted in seconds. For more benefits, see pp. 54-55.

High profile for maximum safety. *For routine cuts, the high-profile system—with its riving knife, blade cover, and pawls—provides the highest measure of safety.*

Choose low-profile when high-profile can't be used. *For some cuts, the blade cover interferes with the operation. These include narrow rip cuts (left), and non-through-cuts like slotting (bottom left) and using a tenoning jig (bottom right). The low-profile knife stays just below the top of the blade, but gets you the same kickback protection as the high-profile system.*

Tablesaws are getting safer, thanks to a long-overdue Underwriters Laboratories (UL) standard, effective in 2008, that requires all newly designed tablesaws—from benchtop models to full-size cabinet saws—to include a riving knife as part of the blade-guard system. (Models put to market before 2008 can be sold without a riving knife until 2014.) All manufacturers are working to meet the standard, and most are starting with their flagship cabinet saws. Due to patent laws, companies have taken different approaches, so I recently tried the new systems, head to head, to see who has the most convenient and accurate new safety equipment.

Before I get to that, however, it helps to understand how a riving knife makes a tablesaw safer.

Riving knife prevents dangerous kickback

Used properly, tablesaws are safe machines. Most woodworkers operate them without ever having a serious injury. But a tablesaw can make you pay dearly for inattention or lapses in judgment. In 2001 alone, the tablesaw sent an estimated 38,000 woodworkers to hospital emergency rooms,

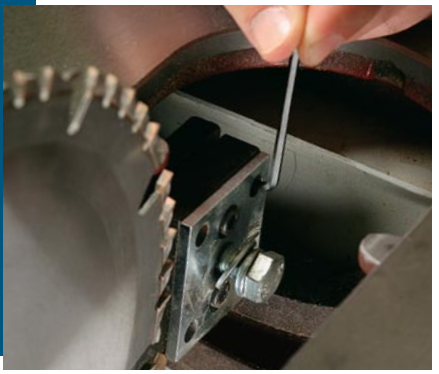
Features that matter

IN OR OUT IN AN INSTANT

Look for knives that can be removed and replaced easily. If the process is slow, you're less likely to use them. All these riving knives had decent changeout times, but not all were equal. Wrenches slow the process (top); Delta's front-of-table release is convenient (bottom).

EASY-TO-ALIGN KNIFE

To work effectively, the knife must align with the blade. Even though it's essentially a one-time procedure, you don't want this adjustment to be a chore. Shims (above) take more time; screws (right) provide control and simplicity.



according to statistics from the U.S. Consumer Products Safety Commission.

Based on lots of anecdotal evidence, we know many visits are the result of kickback, the dangerous event that typically occurs when a workpiece inadvertently contacts the back teeth of the spinning sawblade and is fired back into the face, neck, hands, arms, or torso of the operator. Plus, in certain instances, kickback can cause a hand to be drawn into the blade. A riving knife goes a long way toward making you safer from kickback.

Much like a splitter used on older tablesaws, a riving knife is a thin, stiff, steel plate installed from above the tabletop, just behind the sawblade. Both mechanisms are meant to prevent kickback, but a riving knife has big advantages over a splitter when it comes to safety and convenience.

The problem with splitters—Walk into any small woodworking shop and chances are you won't see a splitter on the tablesaw. That's remarkable when you consider that woodworkers as a group are pretty safety conscious. The problem isn't with us, it's with the poorly designed splitter systems that have been around for decades. Ask any woodworker and you'll get three reasons why splitters are less than ideal, and why most splitters spend their days sheltering spiders in a dark corner of the shop.

First, while they reduce kickback, splitters aren't suitable for the way small-shop woodworkers use a tablesaw. We constantly switch from ripcuts to crosscuts, narrow cuts to wide cuts, and rabbet cuts to dadoes. We cut miters, bevels, slots, grooves, and more. The splitter doesn't adapt easily to all those different cuts. Second, once the splitter is removed, it's a chore to replace. Wrench work is the norm, and the process is slow. Third, because of the way splitters mount to a saw, they end up too far from the sawblade, and that increases the likelihood of kickback.

On the other hand, a riving-knife system has two interchangeable knives. If one won't work for a cut, the other will. Also, both types fit close to the blade, making them better suited to reducing

USER-FRIENDLY BLADE COVER

The cover should stay up when raised, so that you can peer down over the blade to align it with a cut line. The cover should lift easily, and let you see the cut as you feed a workpiece into it. Aluminum (upper left) makes that difficult. Clear covers (left) are better.

Photos: Tom Begnal

First look: 8 riving knives

Johnson collected the first eight riving-knife cabinet saws to come to market, and then spent several days in the *Fine Woodworking* shop giving just the knife systems an up-close look. All of them were acceptable, but some stood out from the crowd.

GENERAL 650R

www.general.ca

Street price: $3,000

Knife adjustment: **Very good**

Switch-out simplicity:
Low-profile: **Very good**
High-profile: **Good**

Blade-guard system: **Good**

Low-profile knife gets very good marks. *It couldn't be easier to add the low-profile knife; just insert it into the holder. You don't even need to remove the throat plate (above). To remove it, take out the plate and pull out a locking pin.*

On the General, it's easy to replace the low-profile knife, simply by pushing it into its holder. To remove it, though, you must remove the throat plate. Then you just pull a spring-loaded pin and pull out the knife. It gets a little fussier to change out the high-profile knife. That's because the throat plate can't be removed entirely with the blade cover in place. So the plate has to be partially lifted and tilted so that your hand can reach a spring-loaded locking pin. Four setscrews and four locking screws allow the knife-holder to be adjusted and locked. The aluminum blade cover is extra sturdy but makes it difficult to see the cut line.

GRIZZLY G0651

www.grizzly.com

Street price: $1,700

Knife adjustment: **Fair**

Switch-out simplicity: **Fair**

Blade-guard system: **Good**

Bolt action. *To attach a knife to the Grizzly saw, insert it into the holder (make sure the shims are in the right place) and tighten the hex bolt with the supplied wrench.*

For knife alignment, the Grizzly uses a fixed knife-holding block. Metal shims are used to make side-to-side adjustments, but there's no way to adjust the knife if it's not parallel with the blade, short of bending it by hand. Ours needed bending, but I aligned it just fine. Both the low- and high-profile knives are removed by taking off the throat plate and loosening a single hex bolt. (The wrench is on one end of the arbor-nut wrench.) To attach a knife, insert it into the holder and retighten the bolt. That's easy, but the shims slowed the changeout when I had to fuss with them. The blade guard is user-friendly.

JET 708675PK

www.jettools.com

Street price: $2,150

Knife adjustment: **Very good**

Switch-out simplicity:
Low-profile: **Very good**
High-profile: **Fair**

Blade-guard system: **Good**

Toolless changeover. *Swing a lever to lock or unlock the Jet knives.*

Jet has a knife-holding block with four setscrews for adjusting the knife-to-blade alignment. You only have to align it once; two additional screws lock the assembly in place. To remove the low-profile knife, lift out the throat plate and then swing a lever handle to the open position. Changing out the high-profile knife isn't as easy because the throat plate can't be removed all the way with the blade cover in place. You must partially lift and tilt the plate to get your hand under the guard to reach the lever handle. The blade guard is user-friendly.

8 saws with riving knives (continued)

LAGUNA MTS0200-0180

www.lagunatools.com

Street price: $1,600

Knife adjustment: **Very good**

Switch-out simplicity: **Fair**

Blade-guard system: **Good**

Wrench work. *Attach a knife to the Laguna saw by tightening a single hex bolt.*

Four setscrews are used to adjust the knife-to-blade alignment on the Laguna. You only have to align it once; two socket-head screws secure the block to the arbor casting. To change knives, first remove the throate plate, then use a wrench (not included) to loosen a single hex bolt. Slip in the new knife and use the same wrench to tighten the bolt. Replace the throat plate and you're ready to cut. The blade guard is user-friendly.

POWERMATIC 2000

www.powermatic.com

Street price: $2,700

Knife adjustment: **Very good**

Switch-out simplicity:
Low-profile: **Very good**
High-profile: **Fair**

Blade-guard system: **Good**

Flip the lever. *It takes just a flip of the lever to lock or unlock a knife on the Powermatic 2000 saw.*

Like its cousin, the Jet saw, the Powermatic uses four setscrews to adjust the knife-holding block, and two more screws to lock the assembly once it's adjusted. To remove the low-profile knife, first take out the throat plate, then swing a lever handle to the open position. As with the Jet, changing out the high-profile knife isn't as easy, because the throat plate can't be entirely removed with the blade cover in place. You must partially lift and tilt the plate so that you have room to slip your hand under the guard and reach the lever handle. The blade guard is user-friendly.

SAWSTOP 31230

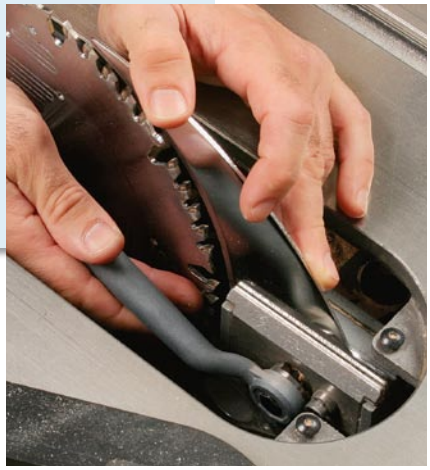
www.sawstop.com

Street price: $3,200

Knife adjustment: **Good**

Switch-out simplicity: **Very good**

Blade-guard system: **Good**



Likable lever. *The generously sized lever on the SawStop helps simplify the task of removing and replacing knives.*

A pair of socket-head screws allows only side-to-side blade alignment. Any lack of parallelism between the knife and blade (our saw didn't have any) requires hand-bending the knife. Not high-tech, but it will work. With the throat plate removed, the knives are easily locked and unlocked using a large lever. Lift up to lock; push down to unlock. The blade guard is user-friendly.

STEEL CITY 35905

www.steelcitytoolworks.com

Street price: $1,350

Knife adjustment: **Very good**

Switch-out simplicity: **Good**

Blade-guard system: **Good**

Knob does the holding. *To tighten (or loosen) the knives on the Steel City saw, rotate a knob about 1½ turns.*

The Steel City saw uses four setscrews to adjust the knife-to-blade alignment. To remove a knife, lift out the throat plate and turn a spring-loaded locking knob about 1½ times. Once loosened, pull the knob and remove the knife. I'd have liked a bigger knob, because it's not always easy to loosen once tightened. The blade guard is user-friendly.

OUR FAVORITE SYSTEM

DELTA UNISAW

www.deltamachinery.com

Street price: $2,900
(not yet finalized)

Knife adjustment: **Very good**

Switch-out simplicity: **Excellent**

Blade-guard system: **Very good**

The new and completely redesigned Delta Unisaw has a wonderful riving-knife system. Unlike all the other saws in this group, Delta uses one knife for both the high-profile and low-profile systems. In the raised position, with the blade cover and pawls attached, it's a high-profile knife. But remove the cover and pawls, lower the knife, and it transforms into a low-profile knife. And you don't need to remove the throat plate for any of the steps: The controls are at the front of the saw. Large "horns" on the cover make it a little easier to raise and lower, and it allows excellent sight lines. You align the knife to the blade with four setscrews that adjust a knife-holding block. Once the blade is adjusted, two more screws lock it in place. The saw won't be available until March 2009.

One knife is two. *For a low-profile knife system, simply release the locking mechanism at the front of the saw and push the knife down to the lowest position. (left and center). To convert to a high-profile knife (right), release the lock, raise the knife, and attach the cover and pawls. The changeover takes just seconds.*

kickback. And you can switch from one to the other in no time. No more excuses for not having a riving knife on your saw.

Why are there two types of riving knives?— Riving knives can be broadly classified into two types: high profile and low profile. A properly equipped tablesaw should have one of each.

Typically, a high-profile riving knife is longer and taller than the low-profile version. All that extra area serves mainly as a surface for attaching a blade cover and pawls. Together, the three parts form the blade-guard system. Equip a tablesaw with this system, and you have the best possible defense against both kickback and hand-to-blade contact.

The top point of the high-profile knife is above the highest point of the blade, so there are times when a high-profile riving knife can't be used. For example, when cutting a groove, the blade cuts only partially through the thickness of a workpiece. If you were to try that cut with a high-profile knife, the knife would get in the way. The high-profile knife also interferes with the use of a crosscut sled or a tenoning jig.

That's where the low-profile knife comes in. The topmost point of the knife is just slightly below the highest point of the tablesaw blade, allowing you to make any non-through-cut with the knife in place. Also, you can use it with a crosscut sled and tenoning jig. In short, the low-profile knife works for every tablesaw cut except when using a dado set. Indeed, you could put a low-profile knife on a saw and seldom have to touch the knife again.

To find out how the riving-knife systems compared on the newest 10-in. cabinet saws, I looked at the Delta Unisaw, General 650R, Grizzly G0651, Jet 708675PK, Laguna MTS0200-0180, Powermatic 2000, SawStop 31230, and Steel City 35905. Check pp. 51-53 for the summaries.

A new era in safety

All of the riving knives on these saws are winners in my book. Each makes the saw a lot safer from kickback, and I'd gladly take any of them over a tablesaw with no riving knife.

Overall, though, my favorite is the Delta. It's especially easy to switch from a high-profile to a low-profile knife and back again without removing the throat plate. I also liked the blade cover because the side guards can be lifted independently out of the way for good sight lines and quickly dropped back in place for good protection. Light, compact, and easy to remove or replace, the Delta Unisaw's riving-knife system gets my vote as the best in this group. □

Roland Johnson is a contributing editor.

Closer look at a safety revolution

The splitter has been around for decades. It makes a tablesaw safer, but not nearly as safe as a riving knife, because there's always too much space between the front edge of the splitter and the teeth at the back of the sawblade.

A riving knife, on the other hand, is mounted close to the sawteeth, typically ⅛ in. to 3⁄16 in. away. And when you raise or lower the blade, the knife moves along with it, always staying the same distance from the teeth (see diagram at far right). Also, unlike some splitters, the riving knife stays with the blade even when it's tilted to make bevel cuts. Splitters have another disadvantage: They're fussy to remove for certain operations (see facing page), and just as fussy to replace. That's why many of them end up collecting dust in a corner of the shop. A riving knife goes on and comes off in seconds.

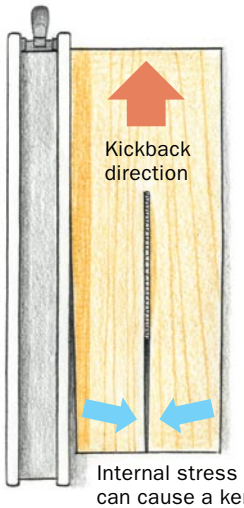
Online Extra

To watch tablesaw kickback in action, go to **FineWoodworking.com/extras.**

FIRST, UNDERSTAND KICKBACK

Most kickback occurs for two reasons: Either the sawkerf closes and pinches the teeth at the back of the blade, or the workpiece pivots and contacts those same teeth. Splitters and riving knives are intended to prevent both of those events.

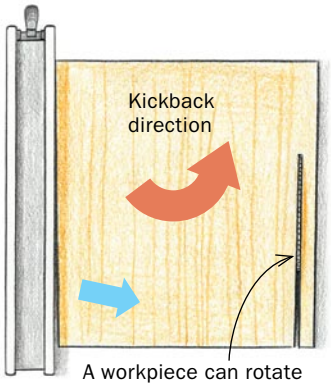
KICKBACK FROM BINDING



Internal stress can cause a kerf to close and pinch against the back of the blade.

Pinch protection. *A splitter or riving knife fills the kerf, so if the wood starts to close, it pinches the splitter or knife, not the blade, preventing kickback.*

KICKBACK FROM PIVOTING

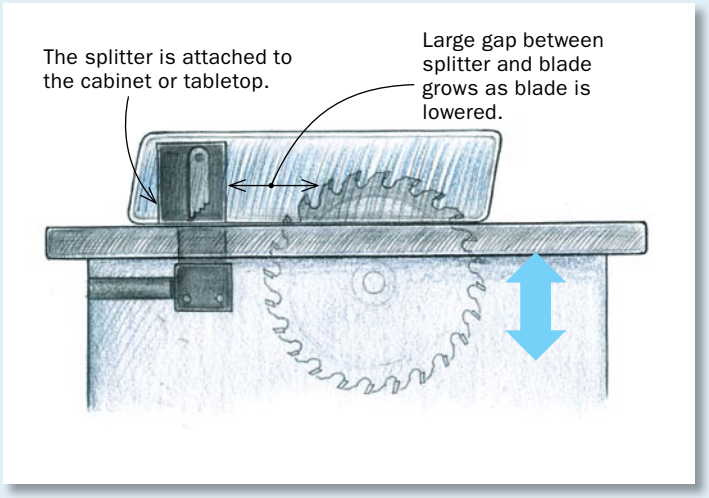


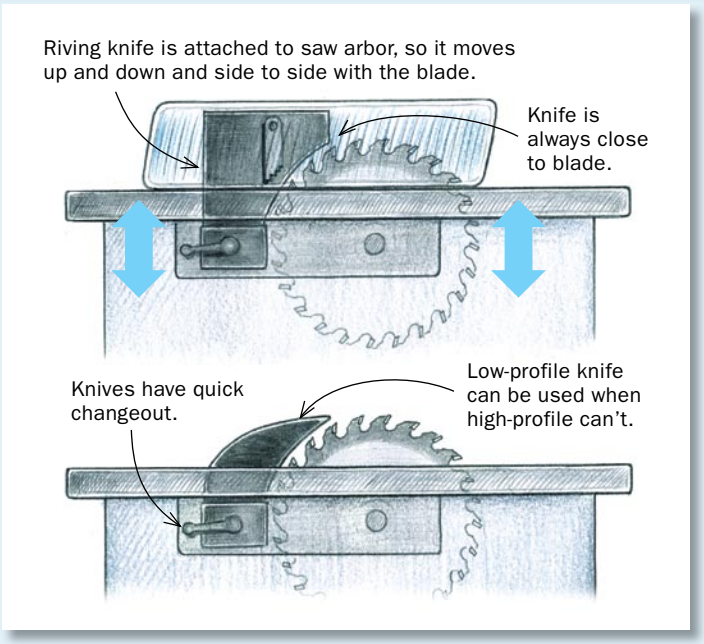
A workpiece can rotate away from the fence and into the rear teeth of the blade, hurling the workpiece like a Frisbee.

Pivot protection. *A workpiece that inadvertently pivots into the teeth at the back of the blade is likely to go airborne. A splitter or riving knife acts as a barrier to prevent that contact.*

Drawings: John Tetreault

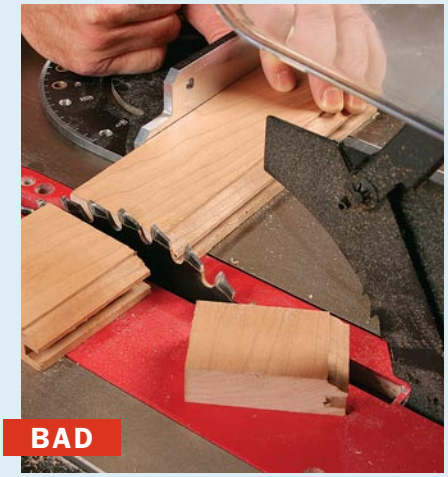
OLD-STYLE SPLITTER VS. RIVING-KNIFE SYSTEM





LARGE GAP MEANS LESS PROTECTION

A splitter doesn't move with the blade, so it's not uncommon to have a big gap between splitter and blade. That space could allow a workpiece, or a workpiece cutoff, to contact the teeth at the back of the blade.



SMALL GAP MEANS MORE PROTECTION

A riving knife remains close to the blade all the time, so there's never a big gap between the two. Therefore, there's little chance for a workpiece to contact teeth at the back of the blade.

SPLITTER MUST BE REMOVED OFTEN

For many operations, the splitter system must be removed because it interferes with the cut. Once it's off, you lose all protection from kickback.

PROTECTION WITH ANY TYPE OF CUT

For operations when the high-profile riving knife interferes with a cut, it's an easy matter to replace it with a low-profile knife and still have kickback protection on the saw.

A CHORE TO REMOVE AND REPLACE

Most splitters take too much time to remove or replace. Because of the inconvenience, it's too easy to leave them off permanently. No splitter, no kickback protection.

CHANGEOVER IS EASY

Riving-knife systems are designed to be added, removed, and interchanged with a minimum of fuss. So there's never a good excuse for running the saw without a riving knife. And with the knife in place, you always have kickback protection.