

# Aftermarket Tablesaw



If a tablesaw is only as good as its fence, there are a lot of bad tablesaws out there. Case in point: I have a 1950s-era Delta Unisaw with the original fence. With minimal maintenance, the saw has continued to work flawlessly. With constant fussing and adjusting, the fence continues to make me crazy. It works pretty well until it gets bumped. Then I get out the instructions and make adjustments. The alternative is to fuss with the fence, checking measurements at the front and back of the fence, giving it a little tap one way or the other, measure again. Arrghhh! Drives me nuts.

All a tablesaw fence has to do is lock parallel to the blade. Simple function but a complicated procedure given that the fence must lock parallel at an infinite number of distances from the blade an infinite number of times.

Since Bill Biesemeyer introduced his T-square fence in the 1970s, lots of manufacturers have come up with their own fences,

**New fences on old saws.** We bought eight fence systems, then mounted them on cabinet saws and evaluated them.



# Fence Systems

There are many ways to keep a rip fence parallel to a sawblade

BY JEFFERSON KOLLE

including many that are almost identical to Biesemeyer's (see the related story at right). Rather than review all the Biesemeyer clones, I looked for fence systems with significantly different designs. I found eight, including the Biesemeyer. (John White, the Taunton shop steward, assembled and helped evaluate the systems.)

I chose to review "commercial" fence systems. Some companies make "home-shop" fence systems, which typically have shorter fences and smaller components than commercial systems.

## This is only a test

A spokesman at Delta Manufacturing told me the company has sold more than 600,000 Unisaws since the tablesaw was introduced in 1938. To get as close as we could to an apples-to-apples fence comparison, I amassed seven Unisaws of varying vintages. The eighth saw was a General cabinet saw. In an attempt to avoid being sent ringers, we bought all of the fence systems anonymously either from the manufacturer or from a local retail outlet.

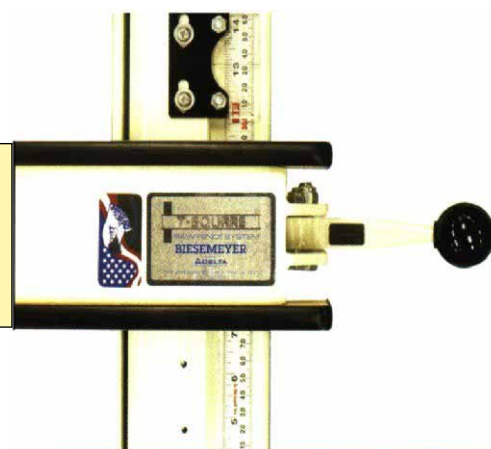
Before we start, a few definitions are in order: *Rails* are the metal bars that attach to

the tablesaw table. The *head assembly* rides along the front rail. The *fence* is the straight metal bar attached to the head assembly along which you push wood when ripping. For the purpose of this article, and to avoid confusion, a *fence system* is a combination of the above components.

## Rough around the edges

While the tops of most older saw tables are beautifully machined, the edges of some tops are rough from the casting process. Cast-iron table-extension wings, like those on the Unisaw, are often slightly longer or shorter than the main table, adding to the problem. To be fair, the rough edges don't affect the saw's performance, but they can have a bearing on how easy it is to attach an aftermarket fence system.

Some of the system's rails get their rigidity by their attachment to the edge of the table. Thus, a saw with an unstraight, unsquare table edge (or edges) can make it difficult to attach some rails. It was necessary to shim some fence rails and to file away at some saw tables to get the rails to attach in a straight line. Check your saw; if the edges of the top are rough and the ex-



## Biesemeyer's fence spawned many clones

BY WILLIAM DUCKWORTH

**Bill Biesemeyer made his fortune the old-fashioned way: He earned it. More than any other individual, Biesemeyer revolutionized the way woodworkers in small shops throughout this country use their tablesaws. Now, at 71, he is, as he says, "trying to retire." The day we called to get his take on fence designs, he was tinkering in his shop—where he has a contractor's saw equipped with the small version of his own fence—building a radio-controlled model airplane.**

**Biesemeyer spent the better part of his working life as a cabinetmaker and boatbuilder. He came to his new career out of frustration. Tired with time wasted and inaccurate cuts made with the old fence designs, he**

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set about making a fence that is a joy to use and that would fit any saw. To provide customers with front and back guide rails that were predrilled to fit right onto their machines, he eventually made 175 different patterns.

After working out the kinks in several prototypes, Biese-

meyer applied for a patent on his design in 1978. The approved patent, No. 4206910, was issued two years later. But after only four years, on the advice of a lawyer, he chose, as he says, "to deny the patent" to avoid any possibility of protracted litigation. With that decision, he essentially gave up the exclusive rights to manufacturing his design. What is

surprising is that it took over 10 years before word got around and the inevitable clones began to appear.

#### IMITATION: THE SINCEREST FORM OF FLATTERY

Calling a saw fence a clone of a Biesemeyer is no insult. We know of at least seven manufacturers that make either commercial-grade or smaller

home-shop models that very closely resemble the original Biesemeyer design: Excallbur (IN41R72 and IN61R72), General (T-fence and Home Shop), Jet (Xacta and Xacta Home Shop), Modulus (SSF-100 and SF-10), Powermatic (Accu-Fence and Accu-Fence Home shop), Rousseau (SF 2050) and Voss (Evolution I and Pro Rip). For the purposes of narrowing

tension wings don't line up flush with the table, it might behoove you to spend some time with a sharp file or grinder.

### Lockup

There are two schools of thought about fences. One school says the fence should lock only at the front rail (the front being the side the operator stands closest to), and the other school says a fence that locks to both the front and rear rails is better. Both schools make sense.

A fence system that forms an absolutely rigid connection to the fixed front rail needs no other connection. And, in fact,

having another connection on the rear rail can throw another possibility for error in the parallelism equation.

On the other hand, a fence that locks on both the front and back rails has double the number of connection points. Another advantage of a front-and-rear locking fence is that it can't lift off the rear of the saw table if you have clamped a hold-down or other ripping device to the fence.

### The importance of being square

After carefully installing and adjusting all the fence systems, John set each fence at 1 ft., 2 ft., 3 ft. and, where possible, 4 ft. from the blade and measured at the back edge of the saw in thousandths of an inch (.000 in.) to find out whether the fence stayed parallel. Our first thought was to include these statistics in a chart. Then we had second thoughts.

With a few exceptions, noted in the comments on the individual fence systems, most of the saws did very well tracking parallel from the blade along the course of their cutting width. Thousandths of an inch should be put into perspective. The thickness of a page of this magazine is .002 in., so a fence that is .010 in. out of parallel at 3 ft. from the blade is out a distance equal only to the thickness of five pages. And the relative accuracy of a cut you'll get with any fence can be compromised by many factors. Both the trueness of a board being ripped and human error play into how straight a rip you'll get, and think of this: The truest tablesaw blades have a runout of .003 in. (see *FWW* #120, p. 43).

To get an idea of how an out-of-parallel fence can affect the quality of a cut, we ran some 5/4 oak through a saw with a carbide blade and a fence we purposefully adjusted out of parallel. With the fence adjusted



**Getting whacked.** Swinging a 2-ft-long, 3-lb. pendulum at the outfeed end of each fence approximates what happens in a shop when a fence gets knocked by heavy sheet goods. After whacking the fences, they were checked for parallelism. All but one fared well.



**Measuring for parallelism.** John White measured each fence at 1-ft. increments to check whether the fence was parallel to the saw blade. He clamped a straightedge to the table, locked the fence and then used a razor knife to mark the fence-to-straightedge distance on a piece of masking tape on a smaller straightedge. After measuring at the front and the rear of the fence, he used an inspection microscope to measure the distance between marks in thousandths of an inch (.000 in.).

.024 in. in from parallel toward the back of the blade, the ripped edge showed considerable burning. When we adjusted the fence out from parallel away from the blade, the findings were different: At .010 in. out, the edge wasn't burned at all. In fact, the cut was slightly smoother than the cut we got with the fence set absolutely parallel to the blade. At .024 in. out of parallel from the blade, we got a smooth cut with no burning, but it was getting hard to keep the oak tight to the fence because it wanted to track with the blade.

The results from the out-from-the-blade setting raise an interesting point—one that is addressed in the instructions for the Mule fence system and the system made by Shop Fox (and one that has been suggested by several *FWW* authors over the years). The suggestion is that adjusting the fence slightly out of parallel away from the blade avoids binding and makes a better cut.

Another important aspect of squareness



the focus of this article, we decided to accept all of these Biesemeyer clones as good copies of a good master.

Though some of their particulars vary—knobs rather than levers to lock the fences to the rails, additional rear-lock mechanisms to use the fence with power feeders that put a great deal of pressure on the rear end of the fence, rails and

steel angle of different thicknesses, faces of polyethylene or plastic laminate—these fences function the same as the original Biesemeyer T-square system.

Prices are all over the map, so if you're considering one of these models, check with at least two or three woodworking equipment suppliers. You can often buy from them cheaper

than you'd get buying directly from the manufacturer.

Biesemeyer's story is an inspiration to many. He didn't set about trying to become a millionaire; he just wanted to make a fence that would do away with the inconvenience inherent in readjusting his tablesaw for a new cut. By the time he sold his business to Delta in 1995, he estimates

that he'd made around half a million fences. Clearly, Biesemeyer is proud of his fence design, and he doesn't mince words about others. "Any fence that has to lock to the back side of the saw [table] stinks," he said, "because it will never set up parallel to the blade." □

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is that the height of a fence be perpendicular to the saw table. For operations like cutting panels or tenons, where you hold wood on its side against the fence, a fence that's significantly out of square to the table can affect the trueness of your cut. Some fence systems can be adjusted for vertical squareness; others cannot. This feature is noted in the chart on p. 57.

### Whack test

All of the fences we looked at have a ripping capacity that will handle sheet goods. In the course of wrestling 90-plus-lb. 4x8 sheets of medium-density fiberboard (MDF) onto your saw table, it's likely that, now and again, you're going to bump your saw fence. We wanted to test each fence system's ability to withstand a good, solid whack. A fence that recoils from a whacking is okay; it's kind of like a 5-mph bumper on a car. We wanted to see whether any of the fence systems were knocked out of alignment.

We set each fence 1 ft. from the sawblade and rigged up a 2-ft-long, 3-lb. pendulum to swing at the back of each one. After whacking, we slid the fence out to the end of its rail and then reset it at 1 ft. to see if the fence was knocked out of alignment. With one exception, none of the fences deviated by more than a few thousandths of an inch. The Craftsman Exact-I-Rip fence was knocked out of alignment by .035 in.—an amount we thought was substantial.

### The Lineup

**Biesemeyer**—Biesemeyer's status is legendary among woodworkers. It's the stuff of metaphors: I once overheard a cabinetmaker telling a peer about the rugged quality of a new power tool he'd bought. "It's the Biesemeyer of routers," he said.



### BIESEMEYER

*Biesemeyer fence rides on a rectangular steel front rail. The plastic-laminate-sided fence is welded to an angle-iron head assembly. The fence slides loosely along its front rail until the lever is pushed down, locking the fence securely.*

*No attachment to the back rail. The back rail serves only to support an extension table. The back of the fence slides along the saw table on a nylon block. Because the fence doesn't attach to the back rail, an outfeed table can butt tightly to the saw table.*



### CRAFTSMAN EXACT-I-RIP



*Craftsman's looks are deceiving. This fence system is well finished, and it has some nice features, like a T-slot fence and a microadjust mechanism attached under the head assembly. The problem is that the fence doesn't always lock square to the rails, and it gets racked out of alignment.*





## DELTA UNIFENCE

*Delta Unifence has a cast-aluminum head assembly. The fence attaches to the assembly with two toggle bolts. Loosen them, and you can change the height of the fence from ½ in. (left) to 3½ in.*

*Fence slides back for use as a cutoff gauge for crosscutting. Used in the 3½-in. setting (right), the fence slides back on the head assembly—just loosen the toggle bolts—for use as a cutoff gauge. The back of the head assembly slides on the saw table on a height-adjustable nylon bushing.*

A massive head assembly is welded to the fence, and the fence locks only to the equally massive rectangular steel front rail by means of a lever-operated cam. The fence, faced on both sides with plastic laminate, glides on the front rails. On the back of the saw table, the fence slides on a thin nylon block. The back rail is steel angle iron that serves only to support a side ex-

tension table. The fence slides loosely along the front rail until the cam-actuated lever is pushed down, locking the fence square to the rail with the rigidity of a locomotive's brakes.

It seems the Biesemeyer reputation is well-deserved. Of all the fence systems we tested, it had no error (.000 in. at 4 ft. from the blade) when we measured for paral-

lelism, and it deviated only .002 in. in the whack test.

**Craftsman Exact-I-Rip**—An extruded-aluminum fence is held with four bolts to an extruded-aluminum head that slides on nylon inserts along a substantial extruded-aluminum front rail. A lever mechanism clamps the rear of the fence against the back rail, which, in turn, snugs the head tightly to the front rail. The finish quality of this fence system is excellent, and the fine adjustment mechanism works well.

It should be noted that the Exact-I-Rip fence system will fit only on saws with 27-in.-wide tables. Once we figured out how far below the table edge to drill the rail mounting holes (1½ in.), the Exact-I-Rip was easy to install.

The Craftsman fence slides loosely along its front rail until it is locked with its lever. And here is where the fence system's major flaw becomes apparent. If the fence is not pushed tightly to the front of the saw, and it is skewed on the rail when the locking lever is pushed down, the fence can lock out of parallel to the blade. Worse yet, locking the skewed fence twists it permanently out of line by ¼ in. or more.

It is our feeling that the four bolts that hold the fence to the head are undersized and too close together to hold the fence and head in alignment. We believe that the undersized bolts are also the cause for this fence system's poor performance in the whack test. If Craftsman addressed this problem, the Exact-I-Rip could be an excellent fence system.

**Delta Unifence**—This is an excellent and unique system with lots of bells and whistles. The extruded-aluminum fence can be affixed to the massive cast-aluminum head assembly in numerous positions. Two large toggle bolts hold the fence to the head assembly. By loosening the bolts, you can turn the fence around so that it acts as a ½-in.-high fence (useful, the manufacturer says, for ripping veneers or offset materials) or as a 3½-in.-high fence. The fence can be mounted to either side of the head assembly—a possibly handy feature for cutting operations made on the left side of the blade. Perhaps the most useful aspect of the fence is that it can be locked anywhere along its length, making a handy guide for crosscutting with a miter gauge (see the inset photo above).

## MULE ACCUSQUARE

*Mule has a locking knob instead of a lever. At \$199, this is the least expensive fence we tested. The Mule doesn't have a lot of the bells and whistles of other systems, but a redesigned front rail makes this an adequate fence system.*

*Mule's spring-loaded wheels ride in a U-shaped channel. Turning the locking knob compresses the springs and holds the head assembly to the front rail. The fence locks to the front rail only, but it slides along the back rail on a nylon block.*



The cursor is easy to read, but there are two hairlines on it: one for reading the fence in its 1/2-in.-high setting and one for the 3 1/2-in.-high setting. We thought we would rarely use the 1/2-in.-high setting and would end up putting electrician's tape over that cursor line to avoid confusion.

**Mule Accusquare**—At \$199, the Mule Accusquare is the lowest priced fence system we reviewed. The extruded-aluminum fence has a T-slot made from angle iron. The fence is attached to the angle-iron head with four bolts. Unlike the other fences, the Mule locks by turning a large knob instead of a lever. Turning the knob tightens a T-bolt in the fence, locking it to the front rail.

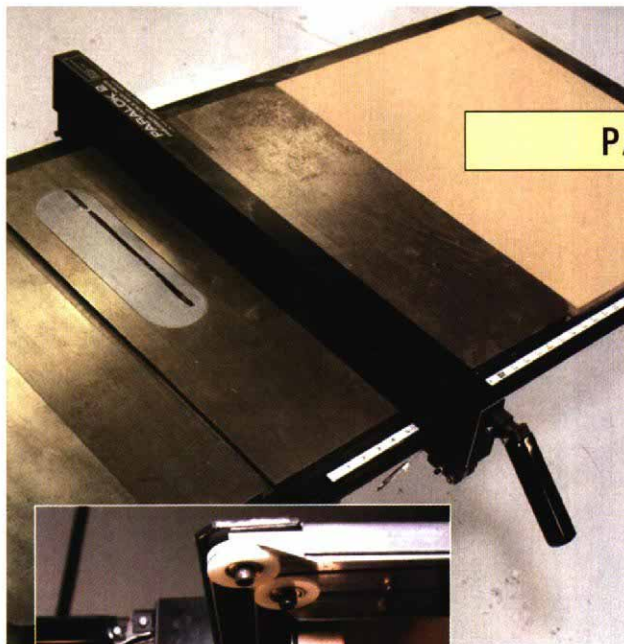
The front rail relies on attachment to the saw table for its straightness and rigidity. In fact, the instructions address this: "The front guide rail must be straight after it is bolted to the saw. Most, if not all, front rails on replacement rip fences are not straight and only become straight when bolted to your saw." We think other manufacturers would take exception to this statement.

When John assembled the fence system, he couldn't get it to slide easily on the rail. Close inspection revealed some poorly machined washers on the rollers that caused the fence to abrade the aluminum front rail. A little work with a file and flipping over the washers alleviated the problem. The instructions are very good, aided by an overview of the installation process on the cover page.

**Paralok 2**—Deryl Waters is an architect who hated the fence on his tablesaw. He modeled his Paralok fence after an architect's parallel-rule drafting table. Since introducing his fence in 1983, Waters has sold more than 10,000 units, with no complaints from any of his customers, he says.

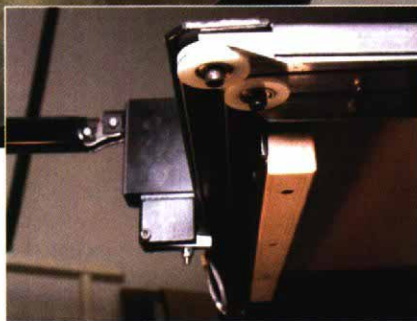
The Paralok 2 fence is held parallel to the sawblade by its attachment, front and rear, to braided stainless-steel cables that travel in ball-bearing pulleys mounted under the steel angle-iron rails. When you move the fence, the cables move around the pulleys. A lever clamps the anodized-aluminum fence to the rails.

This system is quite different from the others in that there is no real head assembly; it is simply a fence with a locking lever at one end. Theoretically, if the fence is set parallel to the sawblade and the cables



## PARALOK 2

*Paralok 2 operates like a parallel-ruler drafting table. Unlike other fence systems, the Paralok 2 fence doesn't rely on its attachment to a head assembly for its rigidity. The fence attaches front and rear to braided stainless-steel cables that ride on pulleys under the rails' four corners.*



*The cable rides in pulleys. The pulleys are mounted out of the way, underneath the four corners of the rails. Unless the cables stretch or the cable-lock blocks loosen—neither of which is likely—the fence stays parallel.*

don't stretch, the fence should never go out of alignment. The fence did very well in both the parallelism and whack tests.

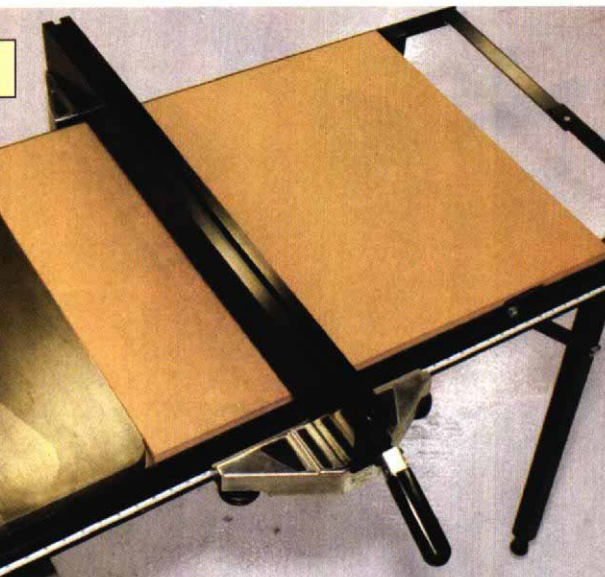
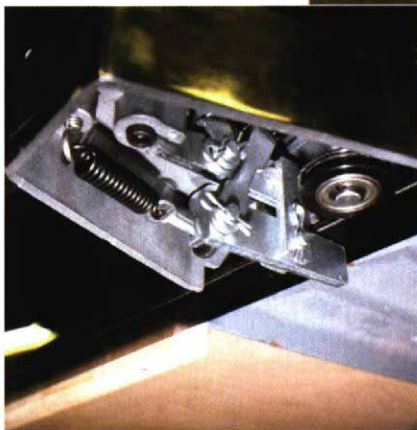
The measurement scale is easy to read; a steel cursor fits close to the adhesive tape rule. The cursor has a vernier scale mounted to it. The cursor allows simple, precise settings between the graduations on the tape, in this case 1/64 in. on a tape that reads only to 1/16 in. It's odd that the vernier scale

is not mentioned or explained in the instruction manual; it's very useful.

**Shop Fox**—The Shop Fox is marketed by the same company that sells Grizzly tools. A black, anodized, extruded-aluminum fence, connected to a substantial polished aluminum head, rolls on grooved ball-bearing wheels that roll on angle-iron rails. The fence locks by means of a Vise-Grip-

## SHOP FOX

*Nice knurls. The knurled guide wheels on the front of the Shop Fox also work as the system's clever micro-adjust mechanism.*



*Shop Fox has a complex locking mechanism. The locking mechanism has more than 40 moving parts, making it the most complex system we looked at. Adjusting the mechanism requires major disassembly.*



## SOMMERVILLE EXCALIBUR

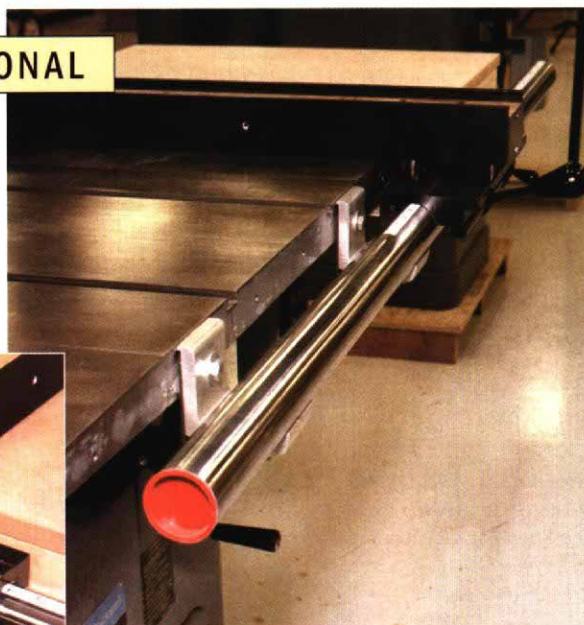
*Sommerville Excalibur has excellent finish and well-written instructions. The fence rolls easily along its rails. Fence adjustments are simple and easy.*



*Fence moves on flanged wheels. The aluminum front rail looks and feels substantial, but mounting it to an uneven saw table can cause it to warp and allow the fence to slip when locked. Finicky and exacting shimming will cure the problem.*

## VEGA PROFESSIONAL

*Front rail hangs off saw table. The chromed steel tube rail attaches to the saw table at only two places, doing away with the need to shim an uneven table. Bolts under the two aluminum angles make it easy to adjust the rail height.*



*Lock the microadjust lever and dial in a precise setting. After dialing in a precise setting, you then lock the main lever. The Vega fence locks on the front rail only.*

## SOME SPECS AT A GLANCE

Make and model	List price/warranty	Locking system
Biesemeyer (800) 782-1831	\$360/ Two year limited	Front rail
Craftsman Exact-I-Rip (800) 377-7414	\$270/ One year limited	Front and back rails
Delta Unifence (800) 223-7278	\$454.50/ Two year limited	Front rail
Mule Accusquare (905) 898-4110	\$199/ Lifetime for home use*	Front rail
Paralok 2 Quintec Mfg. (800) 423-9611	\$350/ Two year limited	Front and back rails
Shop Fox Woodstock Intl. (800) 523-4777	\$315/ One year limited	Front and back rails
Sommerville Excalibur (800) 357-4118	\$379/ Unlimited	Front and back rails
Vega Professional (800) 222-8342	\$325/ One year limited	Front rail

\*Two-year for commercial use

devotes six pages to adjustments and troubleshooting. Adjusting the fence requires major disassembly.

**Sommerville Excalibur**—This T-slotted, Canadian-made fence slides on front and rear, flanged ball-bearing wheels that ride on flat steel bars that are set into extruded-aluminum rails. A light touch of your finger slides the fence along its way. A lever locks the fence by clamping against the rear rail, which, in turn, compresses stiff springs behind the flanged wheels in the head assembly and forces the head casting against the front rail.

The instructions for the Excalibur fence system say it is important that "the front and back edges of your saw's table provide a flat mounting surface." The Excalibur's front and back rails are surprisingly heavy, but their cross sections are small, making

type clamp that grips the front and rear rails. Locking the lever requires some effort, and it unlocks with a violent snapping motion that surprised us.

The Shop Fox is by far the most complicated fence system we looked at. Although the fence moves smoothly and locks solidly on its rails, the overall accuracy of the system is compromised by the lightweight

angle-iron front rail that came from the factory bowed and rippled. In our parallelism test, the measurements were unacceptable: At 1 ft. from the blade, the fence measured .038 in. out of parallel toward the blade; at 4 ft. from the blade, the fence had drifted .105 in. out of parallel away from the blade. The fence locking system has more than 40 moving parts, and the instruction manual



## SUBJECTIVE RATINGS

Rail length (other lengths available)	Fits saw sizes	Instruction manual	Finish quality	Rail installation: (1) on machined table; (2) on rough table	Fence adjustments: (1) parallelism; (2) locking mechanism	Vertical adjustment	Vertical squareness from factory
84 in. (64 in., larger sizes by custom order)	Any	Good	Excellent	(1) Fairly easy; (2) requires shims and/or filing of table edges	(1) Excellent and simple; (2) easy	Not adjustable	Fence slightly out of square to table
70¼ in.	27 in. deep only	Some sections clear; others are confusing	Excellent	(1) Fairly easy; (2) requires shims and/or filing of table edges	(1) Fairly easy; (2) easy	Not adjustable	Fence square to table
83¼ in. (62 in., 128 in.)	Any	Fair; adjustment instruction inadequate	Excellent	(1) Fairly easy; (2) requires shims and/or filing of table edges	(1) Excellent: simple and precise; (2) simple	Simple	Fence square to table
48 in. (60 in., 72 in., 96 in.)	Up to 28 in. deep	Very good; contained overview of installation	Very good, except for chipped cursor	(1) Fairly easy; (2) requires finicky shimming and/or filing of table edges	(1) Fairly easy; (2) no adjustment, due to design	Impractical instructions	Fence very slightly out of square to table
60 in. (48 in., 72 in., 80 in., 96 in.)	Order to fit your saw	Good	Excellent	(1) Fairly easy; (2) requires shims and/or filing of table edges	(1) Very easy; (2) easy	Not adjustable	Fence slightly out of square to table
72¼ in. (48 in.)	27 in. deep only	Fair; numerous small mistakes	Good; some bad spots on anodizing	(1) Fairly easy; (2) will need carefully fit shims or grinding to avoid warping front rail	(1) Slightly complicated; (2) requires major disassembly	Complicated	Fence slightly out of square to table
78 in. (up to 144 in.)	Up to 32 in. deep	Easy to follow and well organized	Excellent	(1) Very easy; (2) difficult: rails can still bow after precise shimming	(1) Very easy; (2) very easy	Not adjustable	Fence slightly out of square to table
62 in. (72 in.)	Up to 32 in. deep	Fair	Poor	(1) Excellent; (2) installation unaffected by rough edges	(1) Fairly easy; (2) no locking adjustment	Not adjustable	Fence square to table

them prone to deflection. Therefore, bolting the rails to a rough or uneven saw table warps the rails. And if you shim the rails off the rail with washers, the extreme pressure exerted by the fence's locking mechanism will cause the rails to deflect. This can cause the fence to slip on the rails or fall out of alignment. Likewise, it is imperative that any extension table you install fit tightly between the rails.

All in all, the Excalibur is a substantial, easy-to-use fence. If your saw's edges are so rough that the rail will need lots of shimming, it might not be the fence for you. (Please note that another manufacturer makes a fence called the Excalibur, which is one of the many Biesemeyer clones. See the related story on p. 51)

**Vega Professional**—The front rail on the Vega Professional fence system is a heavy-

duty, 2-in.-dia. chromed steel tube. The rail stands off the saw table on hefty aluminum brackets, thus doing away with any rough-table-attachment problems other fence systems might have. The brackets have built-in height adjusters that make aligning the front rail very easy.

The anodized-aluminum fence is bolted to a painted, extruded-aluminum head assembly. A smaller secondary head, attached to the main head assembly, has a knurled thumbwheel that is used for fine adjustments. The fence locks only to the front rail by means of a cam-operated lever. It rides on, but does not lock to, a square-tube rear rail.

The Vega Professional is an excellent fence system that's very solidly built. It is easy to attach, especially to saw tables with poor mounting surfaces. It may seem like quibbling, but we were a little disappoint-

ed with the sloppy finish on this otherwise well-machined fence system.

### Better fences make better woodworkers

As these fence systems show, there are many ways to keep a rip fence parallel to a tablesaw blade. An accurate fence system can eliminate a lot of fiddling. Read the chart, check your pocketbook and decide which features are important to you.

In the same way that a seat belt doesn't make you a safer driver, a good after-market fence system doesn't make you a safer woodworker. Be careful: Just because you have a new fence on your tablesaw doesn't mean you can send boards willy-nilly through the blade at 100 mph. □

*Jefferson Kolle is a senior editor at Fine Woodworking.*