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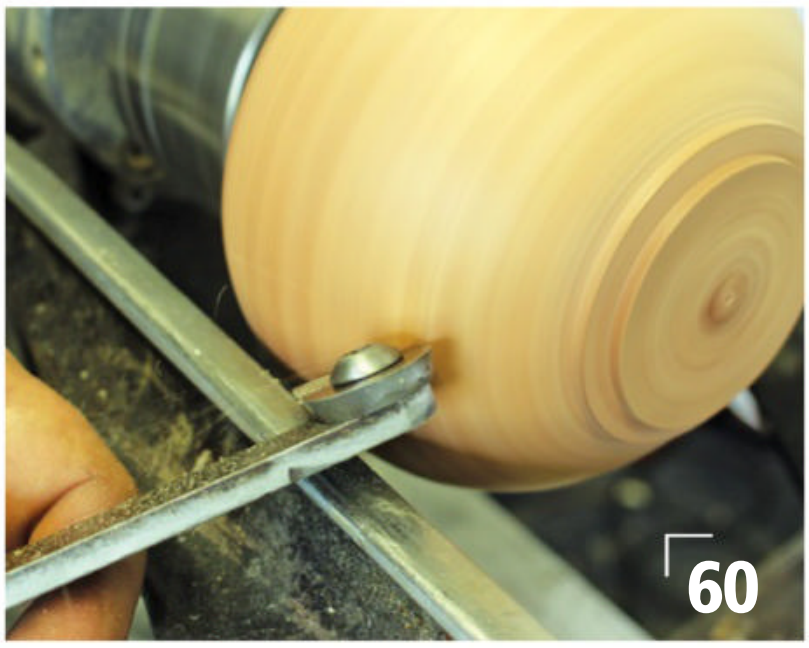

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from the editor

Sawdust

The twisted dovetails on the cover of this issue have to be the most difficult joint I have ever cut.

Over the years I have cut many hundreds of sets of dovetails by hand and have developed my own quirky techniques (one is I use a hacksaw with the blade set horizontally to remove the waste sides of the pins). These days I try and design around the parameters of the Gifkins dovetail jig and have crafted more than a thousand boxes and drawers with this clever Australian invention.

Twisted dovetails are not as simple as they seem. On closer inspection you realise that no machine could ever cut them. Each pin and tail consists of two compound planes that have to seamlessly slide over each other at 45° in order to nest together. This is a challenge with just one twisted dovetail, getting four matching pairs of three to simultaneously slide together and then lock into position to make the jewellery box on page 36. It is a serious challenge!

It was while making the box myself that I used a jeweller's piercing saw for the first time as a woodworking tool. Thinking outside the box had me use a hacksaw to build oversized dovetails in blanket boxes twenty years ago, using a jeweller's piercing saw to cut fine dovetails really was a revelation (see page 66). The fine blade is held in tension by the frame so well that it cuts a surprisingly true and straight line.

Happy woodworking!

Chris Clark, Editor

Australian Woodsmith GO On-Line Extras

This symbol lets you know there's information online at: www.australianwoodsmith.com.au. There you'll see bonus cutting diagrams, articles on techniques, jigs and a lot more. If you don't have access to the internet, contact us on (02) 9439 1955.

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Tips & Techniques

HANDSCREW SANDER STAND

I found it frustrating to try and sand small parts with my random orbit sander. The parts tended to be hard to hold onto and the sander would wobble in my hand, making it easy to round over edges that I wanted square. To give myself a little more control, I found that I could use a handscrew clamped to the bench to hold the sander. Not only does this give me better visibility while I'm sanding small parts, it's also much easier to hold the part flat as I sand them. Now sanding small parts just became a whole lot easier.

Jared Huber

QUICK TIP

SANDING HOLES

I've always found it challenging to sand the inside of small holes. To make things easier, I cut a kerf in a slightly smaller dowel at the bandsaw. Then, after placing folded sandpaper in the kerf, I chucked the dowel in my drill and made quick work of the task.

Chris Hennessey

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SAFETY IN THE WORKSHOP

Safety devices, such as riving knives, guards on table saws and guards over router bits have been deliberately left out of the line drawings in Australian Woodsmith projects in order to make them easier to follow. It goes without saying that where safety devices have been supplied by the manufacturers you should use them. We encourage the use of push sticks as good work practice.

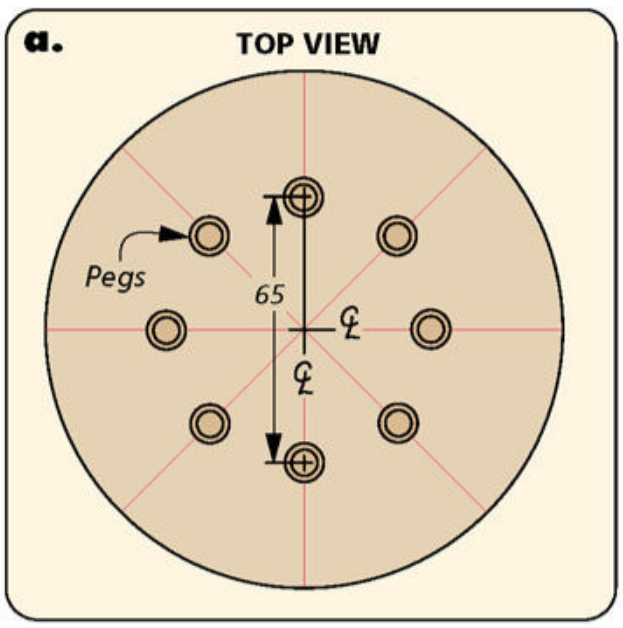
Exercise vigilance and the greatest of care when using power tools, whether stationary or portable. Keep all your tools sharp and well maintained. Wear protective eyewear, a dust mask and a hearing protector when appropriate. By limiting distractions and developing safe work practices you will go a long way to avoiding workshop accidents. So, work safe fellow woodworkers. -Editor

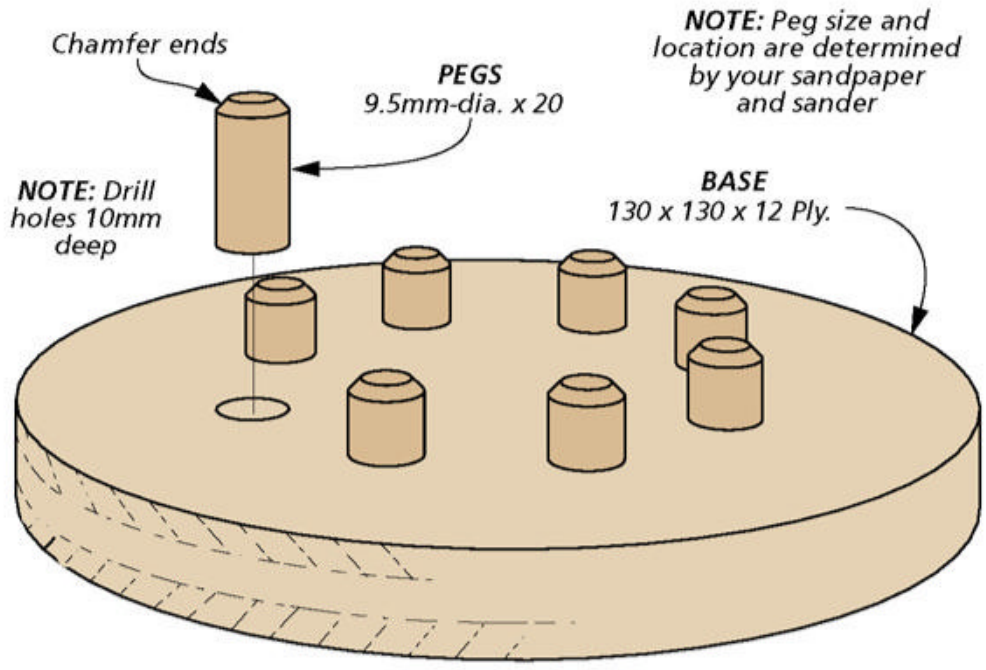
SANDPAPER QUICK RELOAD

Aligning the holes of my random orbit sander to the holes in the sandpaper has always taken more time than it should. My solution was to use a biscuit tin, combined with a simple alignment jig.

As you can see in the photos, the alignment jig is just a series of dowels that fit into holes drilled into a bottom plate. The sanding discs fit over it, loop side up. Then, when it's time for a new disc, I can open the tin and slip my sander over the dowels. Suddenly it's a lot faster, easier and tastier to reload my sander.

Charley Christenson





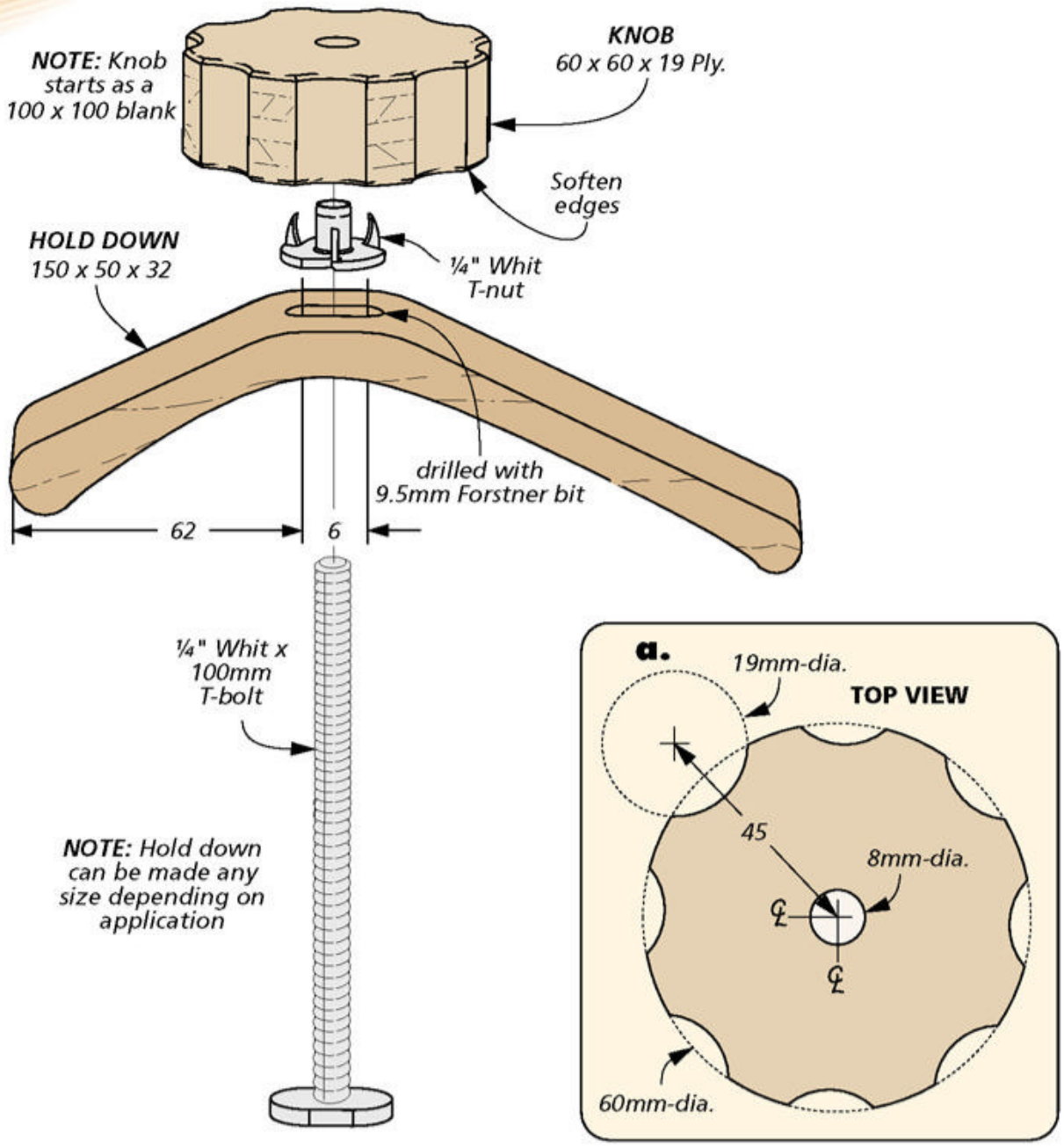
WORKSHOP-MADE KNOB

I think we're all familiar with the struggle. You're working on a project, need a knob for a jig, and lo and behold you don't have one the correct size. To avoid this frustrating problem altogether, I have just started to make my own knobs, like you see here.

A SERIES OF HOLES. The knobs are easy to make. I make mine out of plywood and start by laying out a series of holes. Then, after spending a few minutes at the drill press drilling the holes, I can cut the knob out and am left with the perfect knob. The best part of all is that they can be made for any size thread simply by installing a different T-nut.

One of the great uses I found for these was to combine them with a piece of stock cut into a curve. They make the perfect hold-down.

Sally Neimeier



QUICK TIPS

WORKBENCH MAT

Jim VanWiltz found that a carpeted floor runner was the perfect workbench mat. The mat provides a cushion to prevent dinging parts and also keeps them in place while he is working with them. Best of all, the floor runners are inexpensive at most hardware stores.

MANUAL KEEPER

Richard Leif got tired of shoving his power tool manuals inside of a workshop cabinet. Instead, Richard decided to store them at the machine using a clear expanding portfolio. The portfolio attaches to the side of the machine with double-sided tape and closes to keep the dust out.

THE BIG PROTRACTOR

Getting the compound angle right when drilling a mortise for a chair is a serious challenge for most woodworkers. I have a motivated Year 12 Timber Products and Furniture student in my class who is making a rocking chair out of Tasmanian Blackwood. Luckily the previous woodwork teacher left his rocking chair behind when he retired. We needed to measure the angles of the legs so we could set up the pedestal drill bed at the correct angle.

While hunting down a plastic drafting protractor I realised that there was already an excellent and exact protractor sitting on the bench just in front of us. All we did was tweak the sliding bevel so the blade was firm but not locked, then we rested the bevel handle on the underneath of the chair seat and adjusted the blade so it was parallel with the leg.

As you can see, it was then a simple process to walk the bevel to the drop saw, unlock the slide and align the blade of the bevel with the edge of the slot. The splay angle of the legs was 84° (or 6° if you read from the outer index). A note to be aware of is that the blade of the bevel sits snug against the locking nut, otherwise it protrudes beyond the back of the bevel handle and will give you a false angle.

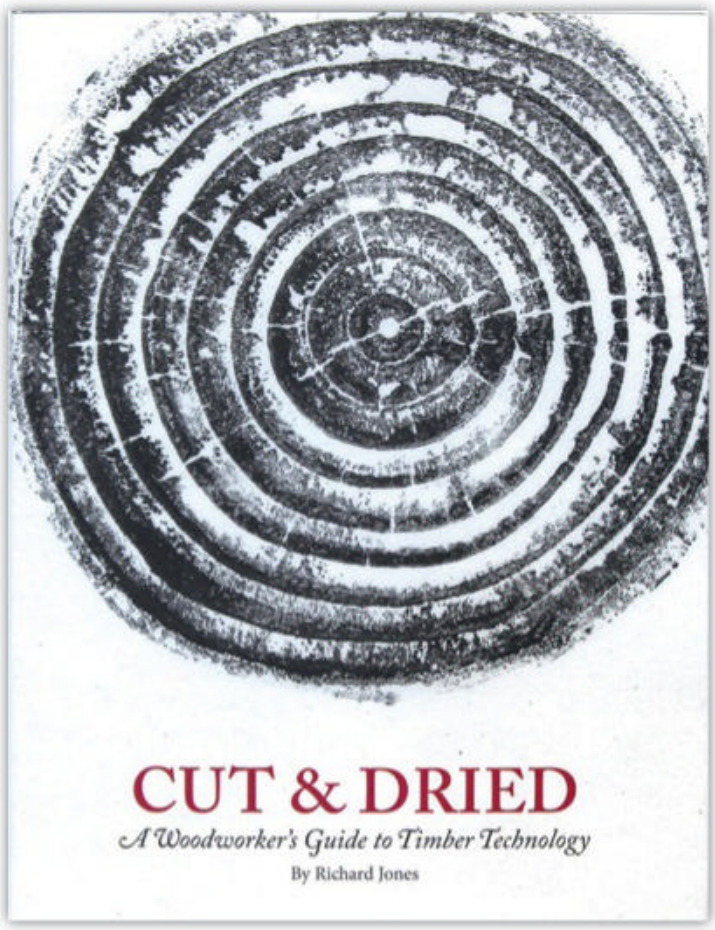
It was such a simple solution to the problem I thought it was worth sharing.

Julia Allan

Next issue of *Australian Woodsmith* on sale 10th June 2021 - Issue 164

Moisture meters and how they work is just one topic we cover in the next issue. We also address kickback on the table saw and how to avoid it. We look into the world of knife-smithing and introduce some kits to get you started on your own knife-making journey. Our weekend project is a hanging wine rack to showcase your favourite tipple. The designer project is an Arts & Crafts front door that might inspire you to tackle the challenge of replacing your front door with one YOU have made! The workshop project is an all-wood traditional English workbench, while our turning project is a yarn bowl for the knitter in the house.

As usual we feature clever tips and techniques from our generous readers.



CUT & DRIED

Richard Jones is a furniture maker and educator who has put pen to paper, allowing the reader to dive deep into his eclectic take on timber, trees, history and furniture design. Richard has spent most of his life designing and building furniture in the UK. In 1993 he moved to the US and set up a furniture making business. Richard returned to the UK in 2003 to take up lecturing positions in furniture design.

Each of the 15 chapters in this glorious tome are further divided into six to 18 sections. Each section has a nugget of insight that will inform and entertain. I learnt that a mature oak tree can produce 90,000 acorns in a year and that in the past, Europeans planted oaks as a food source. The roller coaster ride of insights continues with the Romans in Britain burning most of the oak forests to make iron and steel! (The forests grew back just in time for Henry VIII to cut them down to build his navy.)

In between the Romans leaving Britain and the birth of Henry VIII you have the Norsemen splitting Scandinavian oaks along the medullary rays to produce waterproof and flexible boards, just right for long boats and world conquests.

Richard has had a life-long passion for trees and the stories they can tell. This informs the choice of timber he uses in his furniture and allows the reader to "read" the story of the timbers found in the furniture that surrounds them. *Cut & Dried* is a cross between a history book and a guide to timber technology. Printed by Lost Art Press and available from Lie-Nielsen Toolworks Australia (lie-nielsen.com.au).

Boys' Toys, Books & Gear

HENRY ECKERT NO 507 REBATE PLANE

Henry Eckert continues to add new planes to the stable tools they proudly manufacture in Adelaide. The 507 rebate block plane that Henry Eckert has just released is modelled after the Sargent rabbet 507. The Sargent rabbet 507 was in production in New York from 1912 to 1943 and is now a very collectable US-made plane.

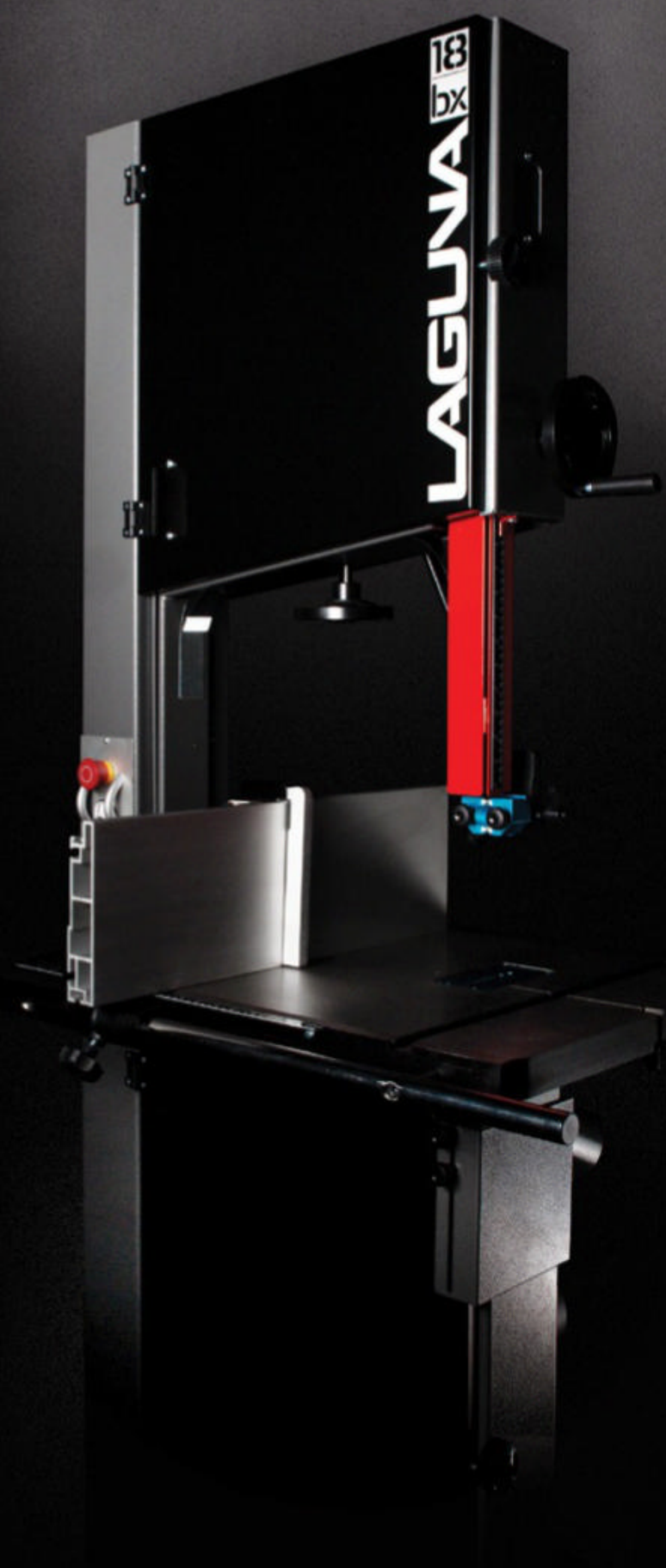
This new generation plane eclipses the original in so many ways. It features a 5mm-thick PM-10V blade instead of a traditional tool steel blade. This feature alone lifts the plane into a class of its own. (Powdered metallurgy has come a long way since 1943.)

The plane also features a Howard adjuster, allowing silky smooth and near friction-free adjustment of the blade. The 12mm-dia nickers are also made from PM-10V steel and do an excellent job severing the fibres of the timber as you plane a rebate.

The symmetrical design allows the plane to be used by left- and right-handed makers. The body is cast in Adelaide from ductile iron, the cap iron is bronze and the other parts are brass and marine-grade stainless steel. The plane is precision manufactured with two holes drilled discretely through the body. These holes rigidly support the optional fence and chamfer attachments that make the plane even more versatile.

David Eckert has a vision to make world-beating planes in Australia. This new plane is bound to make waves and introduce a new Aussie competitor to Veritas and Lie-Nielsen. Available from Henry Eckert Toolworks (thetoolworks.com.au).

LAGUNA



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IWASAKI WOOD FILES

Iwasaki manufactures a range of files that are designed specifically for working with wood. These files are often called "floats" and are used to finesse the mouth, cheeks and beds of wooden planes. What is different about this style of Japanese file is that the milled teeth are cut in an arc (not diagonally as in a traditional file). The unique milling system creates a file that cuts more like a plane, creating shavings instead of filings and leaving the surface smooth and clean. I used the floats above to tweak the planes of the sunrise dovetails on page 66. The first time I saw a float in use was when I visited Terry Gordon at his workshop. It was a tool I didn't know I needed! Available from Japanese Tools Australia (japanesetools.com.au).

WINBAG

This clever invention comes from Denmark and really is a handy tool to have in your toolbox. In essence it is a 160 x 150mm bag that you inflate via the action of a rubber bulb valve. It is designed to support 135kg and will inflate to a height of 50mm. As you can see, it can be used to lift a washing machine so you can level the foot settings. You can also use it to support a door when you are installing its hinges into a frame or help position a kitchen cabinet. Available from Bunnings.

3RT DESIGNER HARDWOOD

3RT is an Adelaide-based company that has developed a process that assembles veneers into awesome 2500 x 500 x 200mm blocks. The veneers themselves are cut from plantation forest thinnings that would otherwise end up as waste. The company not only produces a range of amazing veneer-based products, they are also hoping to export their unique manufacturing technology so that forest thinnings from the world's plantation forests can be converted to boards instead of being burnt.

The two hoop pine panels above look natural and defect-free. If you look at the end grain you will see that the grain pattern is impossible.

The clever, robot-run production line that made these boards coats both faces of the veneer with a non-toxic, water-based nano glue and then stacks the layers together to create a natural look. The whole process takes just 20 minutes! In a natural setting, it would take about 100 years for a hoop pine tree to grow wide enough to produce boards like these. It is amazing that a fast-curing nano glue penetrates the grain of the veneers, binding the layers together as one, and that a 2500 x 500 x 200mm block can roll off the production line and be ready for processing into boards in just 20 minutes!

Sustainable Wood for the 21st Century is the company's mission statement. The 3 Rs in 3RT stand for Reduce, Reuse and Recycle. 3RT Designer Hardwood panels can be purchased from Bunnings.

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After the Fires

Bushfires have been part of the Australian landscape for millions of years. Now they are burning hotter!

One of my favourite drives in New south Wales is the Waterfall Way from the coast to Armidale. After a coffee at Bellingen, I get to play the gears in my Subaru and enjoy the climb up the escarpment to the Dorrigo National Park.

The Skywalk at the park entrance has you walking above the tree line of an ancient Gondwana rainforest. The forest that stretches out in the valleys below includes remnant stands of Antarctic beech, trees that colonised the supercontinent when the landmass was still at the south pole. Two hundred and thirty million years later, Gondwana has broken up, Australia has drifted north, but the forest is still thriving in this rare pocket.

Most mature eucalypts will survive a bushfire. However the 2019 firestorm at Ebor in NSW burnt so hot, it burnt off the bark and killed the tree below.

DRY SCLEROPHYLL FOREST

The next stop in the drive is to stop to buy smoked trout at Ebor and then to have a picnic at Ebor Falls. The dry sclerophyll forest that fills the valleys below is part of the Guy Fawkes River National Park. The main species of tree that can be seen are the newcomers to the landscape: eucalypts. Sixty million years ago eucalypts tentatively appeared in the fossil record, however now they are the dominant species throughout Australia. The reason for this is that they thrive on limited rainfall and can (mostly) survive bushfire.

SURVIVAL OF THE FITTEST

I drove the Waterfall Way last October and was amazed to see how devastating the bushfire season had been for the Guy Fawkes River National Park. The

Ebor Falls are magnificent. Last year's fire raged up the valley with such ferocity, it burnt the lookout and melted glass!

wooden-framed lookouts at Ebor Falls had burnt down, most trees in the valleys had lost their crowns, some were dead, however most were covered in green epicormic sprouts.

What really amazed me was the slumped glass on the ground near a burnt-out lookout. Glass slumps at 700°C! The fires that raged for weeks in the forests below the lookout burnt so hot, they generated their own weather systems that produced a blast of wind so hot it slumped glass.

I spoke to a farming friend who has a property just 50km west of Ebor and he told me that the drought had been so severe he had to destock. Typically, Steve would get an annual rainfall of 800mm. In 2019 his farm recorded a rainfall of just 285mm! This explains why the Guy Fawkes Forest burnt so hot and for so long. The trees were dry as toast and the ground had very little moisture stored away to keep the trees alive.

MOVING NORTH

In the past Australia was covered in rainforests. As the continent moved north, the climate became drier and the rainforest retreated to the fog-filled valleys. Modern research suggests that, for the last two million years, the eucalypts have become the dominant species. Today rainforests make up just 3% of all native forests. The majority of the rest of our native forests are made up of eucalypts.

What is unique about eucalypts is that most species rely on fire to clear the forest floor and crack open the seeds they have dropped so that they can sprout.

Another strategy that the eucalypts have developed is epicormic sprouting.

EPICORMIC SPROUTING

The Blue Mountains west of Sydney are not blue, they are green. From a distance the haze of eucalyptus oil in the atmosphere makes the mountains appear blue. When a bushfire breaks out, it is the oil-rich crowns of the trees that burn first. The fire will leap from tree to tree until the rain comes, or it burns itself out.

What happens next is that the meristematic tissue that has laid dormant in the cambium layer will click into gear and sprout.

The mechanism for this is that the tree reacts to the loss of its crown by producing hormones that stimulate epicormic sprouting in the cambium layer (just below the bark) What is so amazing about this phenomenon is that these sprouts punch their way through the thick bark and very quickly produce mature, full-sized leaves. The trunk and surviving branches of the tree quickly get covered with a rough velvet of sprouts. The fully mature root system of the tree sends the minerals and the moisture through the xylem to this new "canopy" of leaves. The leaves themselves do their job photosynthesizing the light and producing sugars that they then send back to the roots.

The stems at the top of the tree will get more light and will grow faster than those below. As the new crown takes shape, the tree produces hormones that suppress further epicormic sprouting. The stems below this canopy will dry out and drop off. After about five years the crown will be dominant again and the forest will look normal.

It is only when the tree is logged that its history of bushfire survival can be seen. Small whorls and burls will be evident in the timber at it is machined.

Each piece of wood that you work has a story to tell. Surviving a bushfire is one story that most gums can tell. W

Epicormic sprouting will soon have a tree covered in leaves so it can continue to harvest light and generate the sugars it needs to grow and thrive.

Epicormic buds punch their way through the thick bark of a burnt tree, rapidly sprouting mature leaves.

Diamond Plate Finishing

Burnishing oils are a popular finish for woodturners. They can also be used to create silky smooth finishes on flat surfaces.

Hard Burnishing Oil is my preferred finish when I turn legs and spindles on a lathe. The oil quickly floods the sanded surface, penetrating deeply into the fibres of the wood. Working up through the finishing grit sizes (600-1200) has the oil form a slurry with the dust that has been abraded. The slurry works its way into the pores of the hardwood and forms a mirror-like silky finish when buffed with a folded cotton cloth.

Twenty years ago, I watched the same process being applied to a breadboard-sized piece of wane-edged rosewood. The venue was the Working With Wood Show at the old Sydney showgrounds. A sales rep from Organoil used a Festool orbital sander and a range of papers to transform a rough sawn piece of firewood into an amazingly well finished cheese platter. The trick towards the end of his demonstration was to use hard burnishing oil as a wet lubricant, creating a slurry that both polished the timber as well as filled the pores. A buffing mop did the rest.

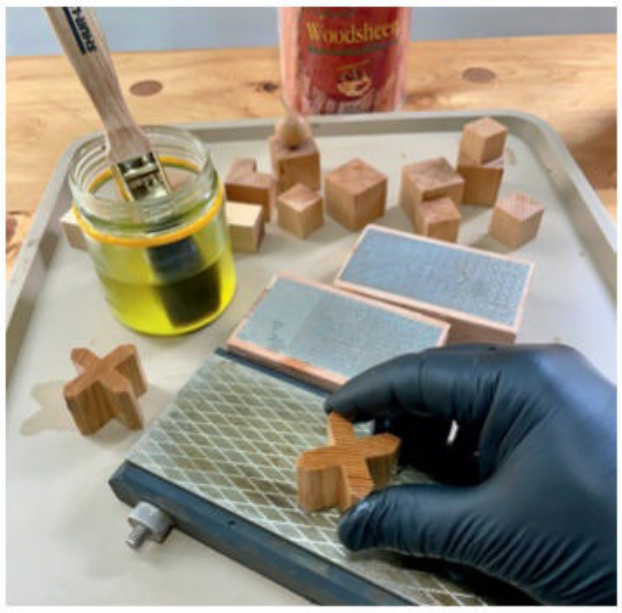
The first step in finishing the Bauhaus chess set in issue 162 was to dunk each piece in Hard Burnishing Oil. A month later I burnished them with Woodsheen Rejuvenating Oil.

These clever sandpapers are stainless steel foils, impregnated with diamond grit.

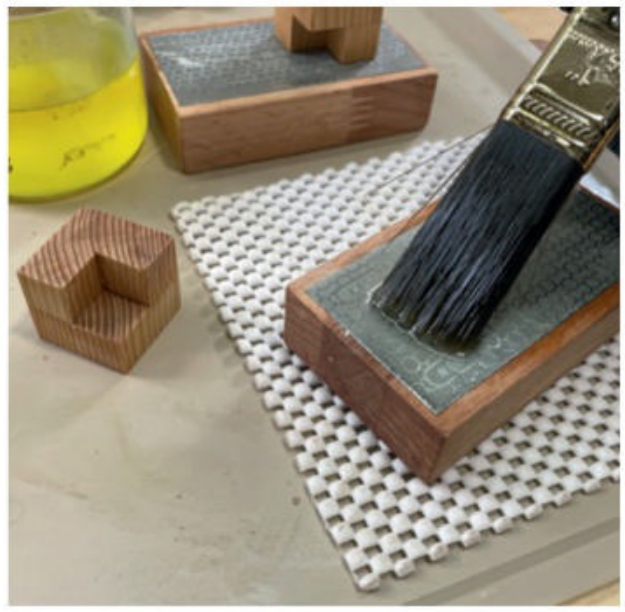
DIAMOND PLATES

Diamond plates are mostly used in the workshop to true a waterstone and to lap the backs of chisels and plane blades.

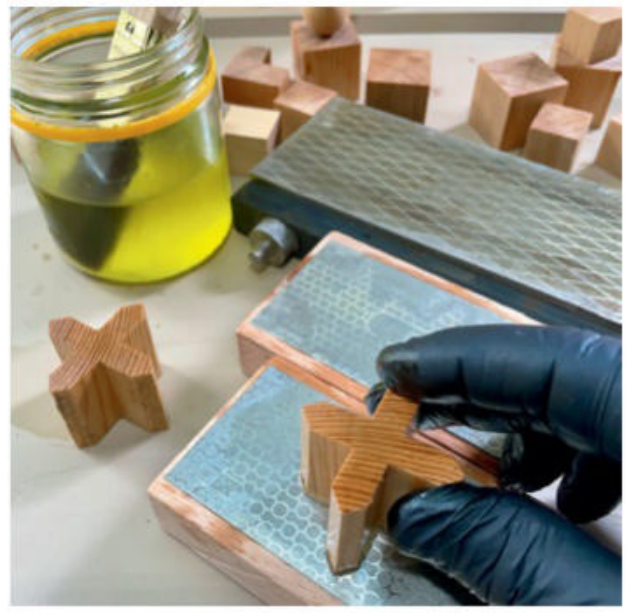
In a moment of inspiration, I realised that they could also be used as a platten to burnish the end grain of the chess pieces I made in Issue 162! All I needed to do was soak the diamond plates in soapy water and scrub away the iron filings. Burnishing oil could act as a lubricant and elbow grease as the motive force.



Diamond plates are made perfectly flat, just right for truing and burnishing end grain.



Instead of water, burnishing oil acts as a wet lubricant and slurry medium.



The 1200 grit diamond sandpaper did a great job burnishing the celery top pine.

DIAMOND SANDPAPER

The diamond plate that is used most often in the workshop has a coarse 300 grit face and a fine 1000 grit back. As you can see above, it worked well as a lapping platten to sand the end grain of the celery top pine chess pieces.

I also had some adhesive backed diamond sandpapers sitting in my abrasive drawer. The diamonds in these "sandpapers" are fixed to thin stainless steel flexible foils. These foils can be mounted onto a flat platten or wrapped around a curved form to create a bespoke sanding pad.

I mounted the 150, 300, 600 and 1200 grit foils onto flat beech bases and used them as plattens. The 600 grit diamond platten did most of the flattening, while the 1200 grit foil took care of the burnishing.

As you can see, I flooded the diamond plattens with Organoil Woodsheen rejuvenating/buffing oil and rubbed away until the surface was silky smooth. A final buff with a cotton cloth had each face looking and feeling fabulous.

After I burnished the "white" pieces I cleaned the diamond plates with turpentine and then repeated the operation with the rosewood pieces.

In the past I have used wet and dry papers to burnish flat stock, but have been disappointed to find black carbide stuck in the pores of the wood I was polishing. Diamond plates leave the faces both flat and clean. (See page 73 for sources.) W

After the excess oil was wiped away, each piece was buffed by hand until it shone.

It was while burnishing the rosewood pieces that the slurry became more obvious.

Using a flat diamond plate as a burnishing platten not only had each face shine, it also kept the distinctive crisp lines of the Bauhaus chess set sharp.

Getting more from your Belt Sander

Disc sanders are great for end grain work, while a belt sander is designed primarily for long grain. The issue most novice woodworkers have with belt sanders is that they don't appreciate the need for the belt to shed the dust that builds up underneath the surface being sanded. The photo above is a good example. Here I am not sanding the surface flat, I am sanding the spline joints flush. When the splines are flush I can then sand the surface smooth with a random orbital sander. If I stay with the belt sander, the dust that is cut as the belt starts its journey underneath the box side will clog the belt and reduce the abrasive effect of the belt by the time it emerges at the other end of the box. The surface that is left will be angled and not flat. What I need to do if I want a flat surface is angle the box to the belt.

▲ The fence can pivot so it's at an angle to the belt. This allows you to put a flat face on wider boards and panels.

BELT OPTIONS. Sanding belts are available in a wide range of grits. It isn't necessary to own one of each. In fact, I usually keep a 120-grit belt on the machine. It sounds coarse, but it does a good job of quickly removing material, running cool and leaving a consistent surface behind. I find that it's too easy to burn a workpiece with higher-grit belts to make them worth the effort to buy.

MACHINE SET-UP. With a belt in place, there isn't much you need to do to be up and running with a belt sander. The box on the next page highlights the two settings you need to be aware of.

In use, a belt sander is pretty straightforward. Compared to the disc sander, the belt is capable of greater control for refining flat surfaces, complex shapes and curved parts. About the only tricky aspect of using one is learning to "land" a workpiece on the belt without gouging the workpiece. The key is easing the workpiece onto the belt with a steady, but not white-knuckled, grip. Don't worry, you'll get the hang of it in no time.

Part of what makes the belt sander so handy is all the ways you can configure it to suit different needs. Let's take a look at a few of the set-ups.

HORIZONTAL SANDING. For me, the most common set-up for a belt sander is in the horizontal position, as shown in the photos on this page. I use it for creating a flush surface on all kinds of project parts — from wide pieces and completed assemblies down to parts that are too small to safely run across at a jointer.

You can use the sander "freehand" in this configuration especially for working on complex shapes. However there are a couple of accessories that can increase your control over the workpiece and to achieve consistent results.

FENCE. The first is the fence. It's used just like the fence on a jointer. With it, you can keep a workpiece square to the belt as you're sanding. This is helpful for trimming joinery flush, like the mitre splines shown in the photo above.

ANGLED FENCE. Most of the time, the fence is set parallel to the belt, but the fence on many sanders also has an angled setting, as shown in the lower left photo. While it

looks strange, the angled fence set-up is great for flattening boards or panels that are wider than the belt.

Here's how it works. You hold the workpiece against the fence and pass it forward across the belt in a motion that's similar to using a jointer. This technique results in a surface that's much flatter than trying to simply move a wide panel side to side parallel to the belt.

I'm sure you can think of the downside to this method. It does create an angled scratch pattern on the workpiece. However, like I mentioned earlier, I'm not looking for a final surface from a belt sander — just a flat one. You'll find that a random orbital sander removes those angled scratches quickly and easily.

Turn your belt sander into a drum sander by opening (or removing) the idler drum cover to sand concave curves.

The end stop and the fence work together to maximise your control over a workpiece to get the best results.

For vertical sanding, tilt the belt upright. Attach the fence across the belt to serve as a table for sanding curves with ease.

END STOP. The other accessory used in horizontal sanding is the end stop. This metal bar runs across the back end of the belt, as you can see in the upper left photo. I use it as a way to pivot a workpiece onto the belt without worrying about the belt grabbing the part and pulling it out of my hands.

With a workpiece resting against the stop, you can move it side to side to help prevent loading the belt with sawdust or burning the workpiece.

END SANDING. Sanding flat, straight edges and faces are the bread-and-butter tasks of a belt sander. But it can tackle curves, too. One surprising operation is to use a belt sander to refine and smooth an inside (concave) curve, as shown in the left photo. The way to do that is to flip up (or remove) the upper/end guard and use the idler drum.

It works similar to a sanding drum on a drill press. The caveat is that you're limited to curves that match or are larger than the radius of the drum. I find it's a handy way to remove bandsaw blade marks and work down to a layout line.

UPRIGHT. In addition to a horizontal arrangement, the sanding belt can be rotated into a vertical position. (Actually, you can lock it in at 45° as well, but I don't find that setting especially helpful.) When the belt is upright, the fence rotates around to become a table to support the workpiece.

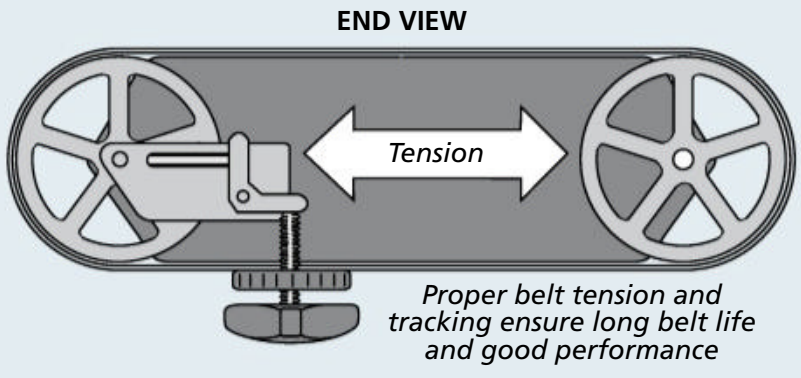
Why bother switching things around? A vertical set-up makes it easier to control a workpiece while sanding the ends, as shown in the upper right photo. I use this set-up for sanding small projects and refining outside curves.

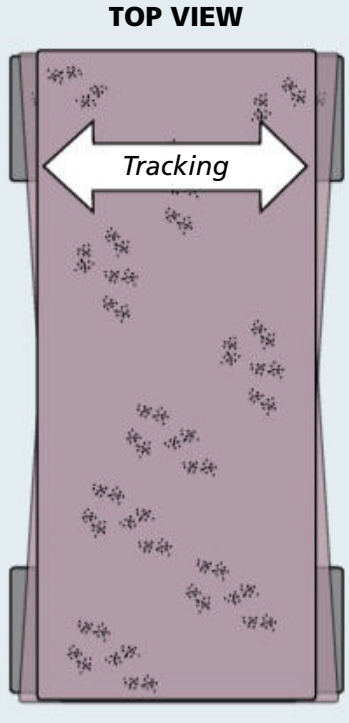
The operation of the vertical position is similar to the disc sander side of the machine. However, you can work with wider parts on the belt since you don't need to worry about the piece contacting the upward rotating half of the disc.

You can even adjust the angle of the table to smooth angled cuts. However, unless the workpiece is wide, this is a task best handled on the disc sander.

Deciding which tools to have in your workshop often comes down to a balance between space and utility. Once you weigh the options, adding a belt/disc sander is worth the upgrade. W

How-To: ADJUST FOR BEST PERFORMANCE





Tension & Tracking. To work right, the sanding belt has to be pulled taut between the drums (tension) and set to run straight and true (tracking). On most sanders, a knob is used to adjust each setting. Set the tension first, then adjust the tracking in small increments while the sander is running to keep it centred on the drums.

Chair Devils

Upcycling old saw blades into cabinet scrapers is a common practice, converting them into chair devils is also an option.

The fine cut blade on my Japanese Kakuri pull saw is a wonder. When used properly, it cuts a fine and straight kerf. When used incorrectly, the teeth shear off! The culprit is always a novice who is used to western-style tenon saws. I have five gapped Kakuri fine cut blades in my saw drawer and have stopped sharing my favourite saw with visitors to the workshop.

The steel in the saws is excellent and is perfectly suited to being transformed into cabinet scrapers. All I do is grind off the remaining teeth, burnish the backbone and use the flexible blade as a cabinet scraper.

CHAIR DEVILS

The workshop stool on page 40 inspired me to go to the Lee Valley website and check out their chair scrapers.

In the end I decided to have a go at making a brace of chair devils out of a couple of gapped Kakuri saw blades.

As you can see to the left, one Kakuri blade yielded three 55mm-wide plates that could then be transformed into chair devils.

The first step was to cut a slot in some 36mm dowel and then slide the old blade up 55mm. I then mounted the "peg" in a vice and used a 1mm-thick cut-off wheel on an angle grinder to cut each plate to length.

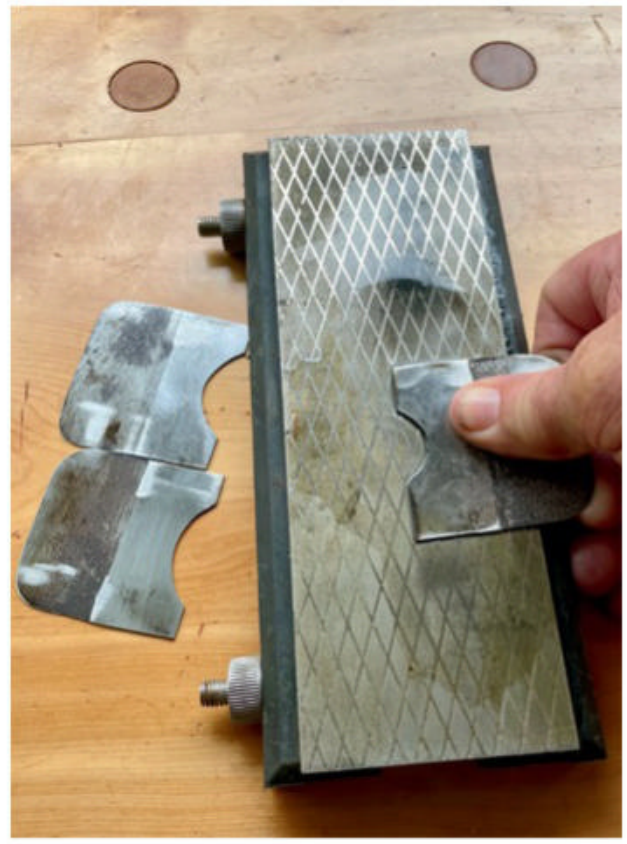
Old panel saws and tenon saws can also be used to make chair devils. All you need to do is cut the slot for the blade the same thickness as the old saw blade. The advantage of a pull saw blade is that it is thin and easier to file a cove in.

Old saws make excellent scraper blades. Mounting the blade in a slotted dowel and cutting to size with a 1mm-thick cut-off wheel is the way to go.

The scraper slot for the chair devil needs to be cut with a similar sized saw blade.

Cove profiles traced in black marking pen make them easy to see when filing to shape.

Cross filing removes the bulk of waste, draw filing smooths out the curve.



WD40 and a 1000-grit diamond plate quickly dressed each face of the scraper blade flat.

MAKING OUT AND MAKING

Chair devils can be used to dress spokeshaved legs or rails smooth. They can also be used to scrape off old finishes from furniture that is being rejuvenated. The stool on page 40 features 38 and 25mm legs and spindles. I decided to make five chair devils 240mm long and with blades that profiled to scrape 45, 38, 25, 19 and 12mm-diameter stock (I had a 1200mm length of 28mm-dia dowel standing in the corner of the workshop). After docking the 28mm-dia dowel to length, I drilled a 5mm-dia hole 60mm up from the base and then drew straight lines on both faces from the top to the drilled hole.

I then rounded each end of the handles on the router table with a 6mm-dia roundover bit.

A Japanese pull saw (that had the same thickness blade as the scraper blades) was then used to cut a slot down to the drilled hole.

A walk to the grinder had the sharp edges of the scraper plates removed and all edges ground true.

Next step was to hunt down the correct diameter dowels so I could use them as templates to trace the curve of the cutter. As you can see, in the end I used holesaws as templates for the coves. You only need to mark out a chord of curve to make a successful chair devil (no need to file out a whole hemisphere).

Black marking pen against the bright steel gave excellent contrast and allowed me to file away with confidence. It took a whole afternoon to file the coves to size (checking the profile against the hole saw until no light could be seen).

When I was happy with the blade profiles I polished each face flat on a 1000-grit diamond plate with the help of some WD40 as a lubricant.

The next step was to centre each blade in its handle, keep the blade parallel to the table and sand away until the bobbin sander drum cut a mouth profile that matched the blade.

It is the burr that does the cutting when you use a scraper. The next step was to remove each scraper plate from its handle and to create a flat on the cove by using the burnishing tool in a draw filing action. Once I had the burr on each face of the plate, I rolled it over with the burnishing tool tilted at an angle.

The plates were then returned to their handle and two screws inserted 15mm either side to lock the scraper blade in place. The final step was to rub the handles down with some camellia oil and wipe them dry.

As you can see to the right, the chair devil can be used to create a round tenon on square stock without the use of a spokeshave. (See page 73 for sources.) W

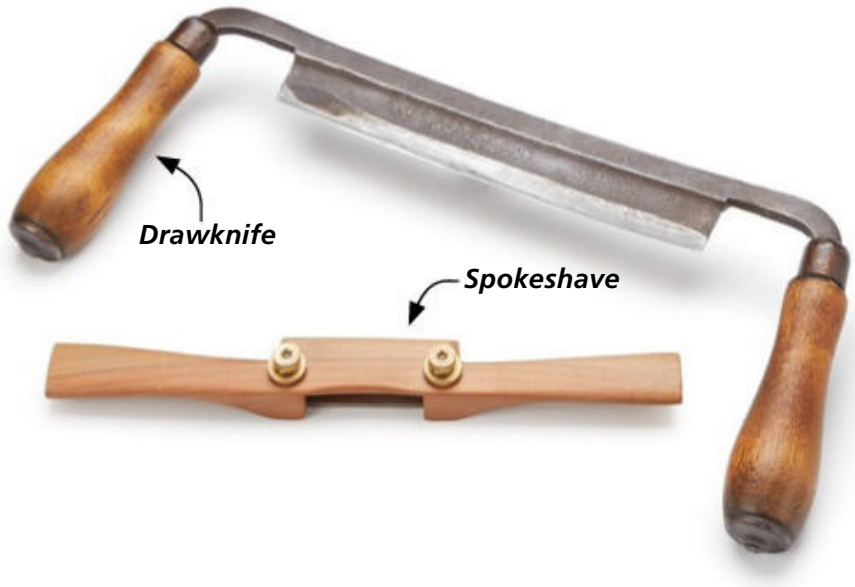
I sanded the mouths of each chair devil on a bobbin sander with the scraper blades in situ.

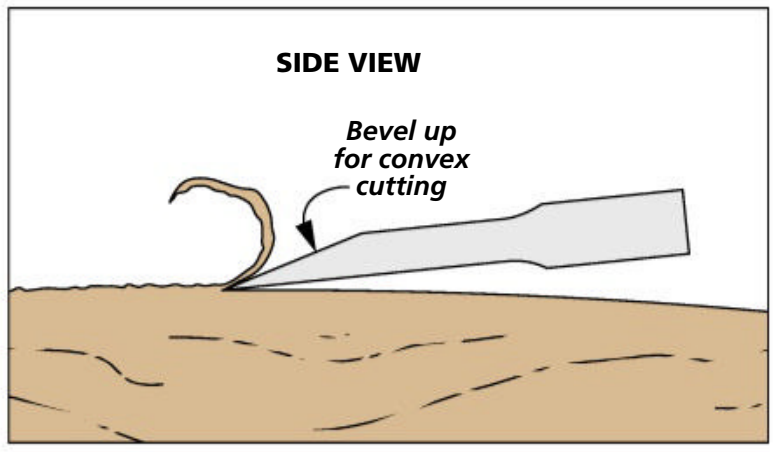
Heavy pressure on the cabinet scraper burnishing tool creates the cutting burr.

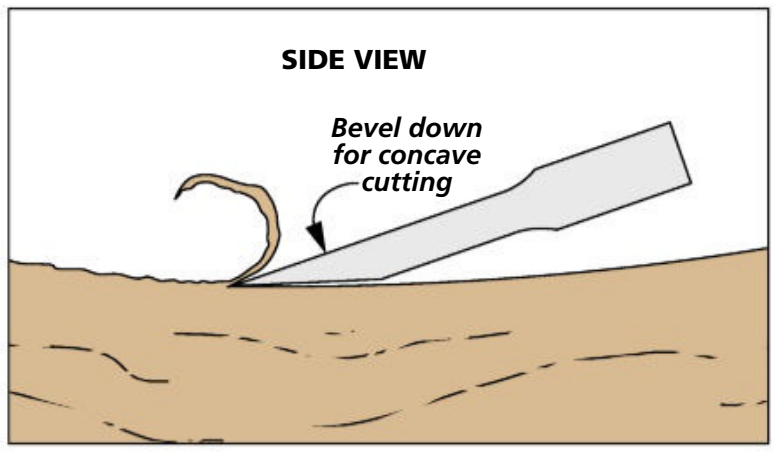
The chair devils clean up spokeshaved legs and spindles (and can also cut them).

Drawknives & Spokeshaves

Some woodworking tools thrive with straight, flat surfaces (think hand planes) while others are meant to cut loose a bit. Drawknives and spokeshaves fall squarely in the second camp. As a result, these tools can be a joy to use and open up a new dimension to your projects. Their freeform nature can sometimes create an intimidation factor for new users. I also believe that spokeshaves and drawknives can be unfairly thought of as simply crude or rustic tools meant for "country-style" projects. Instead, my goal here is to introduce these two tools







and show how you can use them in a variety of ways from coarse to refined.

DRAWKNIVES

While drawknives and spokeshaves are like cousins, it pays to look at them one at a time. Let's start with the drawknife. It has a long blade mounted between two handles bent in line with the direction of the cut. My first exposure to a drawknife was in removing the bark from a log. So I thought that's all it was used for.

FAST WORK. Where a drawknife excels is quickly shaping a workpiece, as shown in the photo on the previous page. With forceful strokes, you can peel off long ribbons of wood while forming a shape.

On the other hand, a drawknife is equally capable of taking fine cuts. Used with finesse, it leaves a polished, slightly faceted surface that just begs to be touched.

Like many edge tools, you'll get the cleanest cuts when working with the grain of the wood. Here's where using a shavehorse can come in handy. It allows you to reposition a workpiece quickly and easily. But drawknives work equally well when the workpiece is secured in a bench vice.

BEVEL UP OR DOWN. The simple design of a drawknife frees you to use it in several ways. You can use the tool with the bevel up or down. Some woodworkers hold (very) strong opinions on this subject. I've found it's best to let the tool and the task at hand take the lead.

Here's what I mean. In general while using a drawknife, you want your shoulders in a relaxed, neutral position, not hunched up. So if that means using the drawknife bevel down, so be it. My drawknife works best with a bevel up orientation.

This is the approach I take when making cuts on flat or convex surfaces. This is shown in the upper right drawing.

When cutting into the valley of a curve, I'll flip the tool bevel down. The bevel facing down allows you to work much tighter curves, as in the lower drawing.

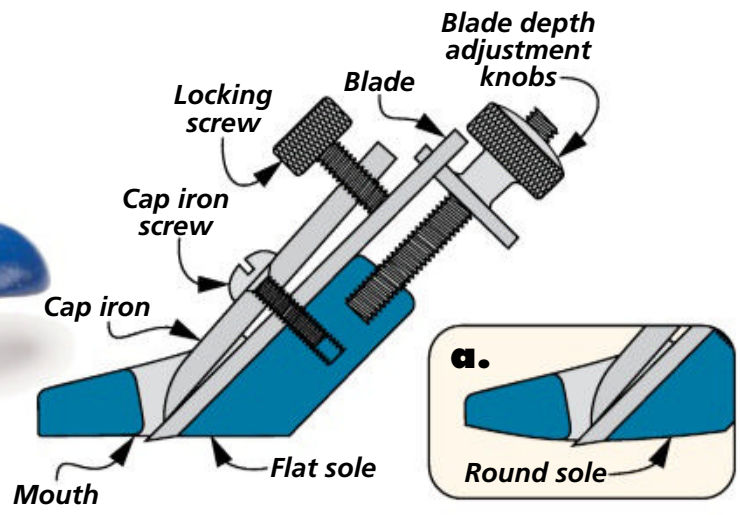
SLICE, NOT JUST PULL. The motion of using a drawknife allows you to use your arms, chest and abs to drive the cut. But it shouldn't all be brute force. Take advantage of the full width of the blade as much as possible. Start the cut at one end of the blade and as you pull forward, slice along the length of the blade to finish at the opposite end.

Sure, it takes some practice to get the motion right, but the payoff is a smoother cut that isn't as hard on you. It also increases the life of your sharp edge.

SHARP WINS. Speaking of sharpening, just like a hand plane or carving knife, the results you get with a drawknife depend on the quality of the edge. The sharper the edge, the cleaner the cut. The catch is a drawknife won't fit in most honing guides and is tough to secure for sharpening. Instead, I use an approach based on the technique of chairmaker Brian Boggs. Shown in the left photo, I hold the drawknife with the blade up and a sharpening stone in the other hand. This braces the tool and gives me a better view while working through the grits.

▲ **Sharp as a Fiddle.** Brace the drawknife against your chest, almost like a fiddle. Hold a sharpening stone in your other hand and stroke along the bevel and back of the blade, keeping your fingers back.

Pushing a metal body spokeshave offers better control as you navigate curves.



SPOKESHAVES

A spokeshave is a more familiar tool — though probably still not often used. Besides size, the main difference from a drawknife is how the blade is presented to the workpiece.

Instead of an exposed blade, the blade of a spokeshave is surrounded by the body of the tool. Much like a hand plane, the body provides a sole for an increased level of control.

That control pushes the tool more into a refining role. So while you can set up a spokeshave for taking relatively heavy cuts, it's still less than the heavy stock removal you get with a typical drawknife.

The primary advantage is that you can set the blade for a specific depth of cut and get consistent results. In addition, the narrow body makes the tool pretty nimble to work on all kinds of surfaces.

GO CONFIGURE. Spokeshaves come in numerous configurations. The two main forms are shown here — metal body and wood body. In addition, you can get spokeshaves with round soles for working inside tight curves or shaves with curved blades for forming round stock.

While the choices may seem dizzying, I'd recommend starting with a flat-bottomed spokeshave. This will give you a good idea of what the tool is capable of and allow you to get the hang of it. They're also much easier to sharpen and set up for fine work. The question then boils down to choosing a metal body or wood body shave.

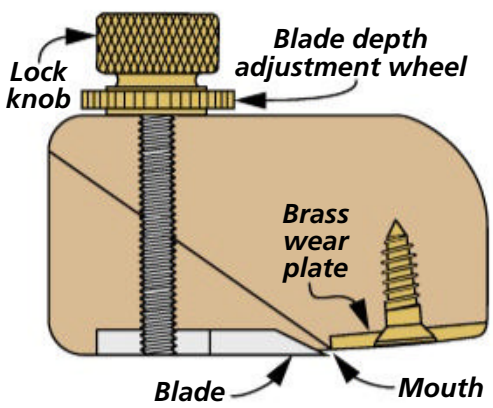
METAL BODY SPOKESHAVES. You're more likely to find a spokeshave with a metal body when searching online or browsing a catalogue. They typically offer better blade adjustments and hold the blade bevel down.

In use, the cutting action of these tools feels more like a hand plane. The metal body and handles give the tool good heft and help dampen vibration that could lead to chatter marks.

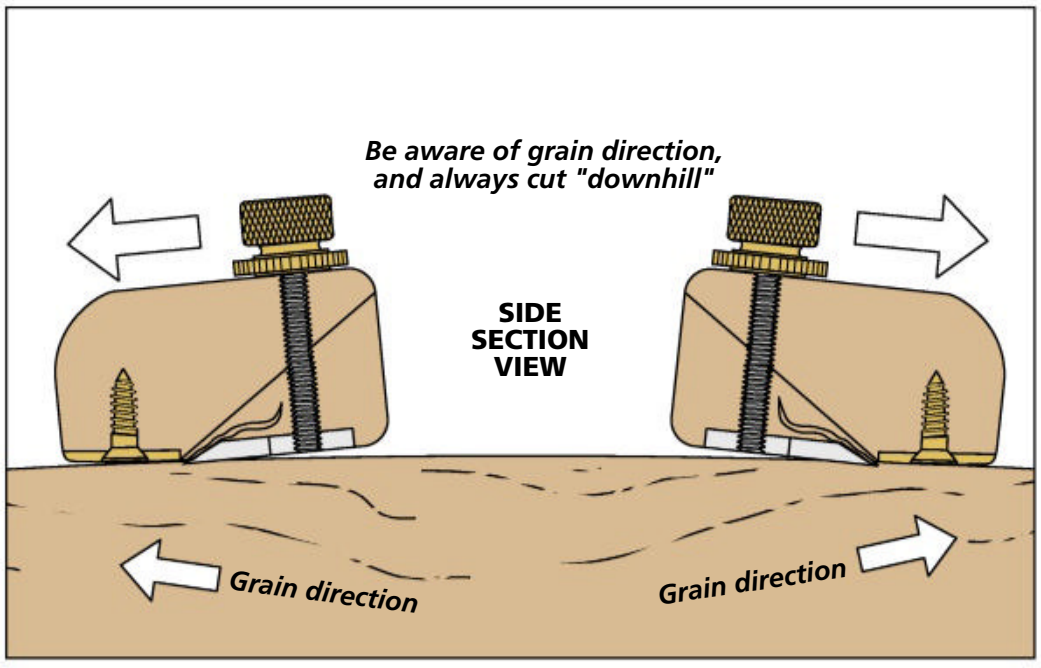
WOOD BODY. Spokeshaves with a wood body are an older style. They're more likely to turn up in antique workshops and flea markets, though you can find some new models from smaller manufacturers. Wood body shaves hold the blade in a bevel up configuration (left photos and drawing) so they cut more like a low-angle block plane. The cut has a slicing, whittling feel to it.

The one shown here is one I made using a blade kit from Veritas (refer to sources on page 73). This set-up offers excellent blade control. And I enjoy the process of making tools that I can use when building projects.

GET A GRIP. The wide handles of a spokeshave are one of its defining features, but can be a little misleading. You're tempted at first to grab the tool way out on the



Wood body spokeshaves work with a shallow, slicing cut. The bevel up blade can be set for fine cuts and cleanly trims end grain as well.



▲ Setting a spokeshave for light cuts minimises tearout and leaves the best surface. Holding the shave close to the blade offers you the highest level of control.

ends, like the handlebars on a bike. It may work, but you lose a lot of sensitivity.

Instead, what you need is more of a pinching grip up close to the blade on either side. The upper left photo on the previous page shows what I'm talking about.

This spokeshave has shallow indentations cast into the front and back of the handles that are ideal places for your index fingers and thumbs. Held this way, you can guide the spokeshave with subtle control to engage the blade and respond quickly to changes in grain direction or the angle of attack.

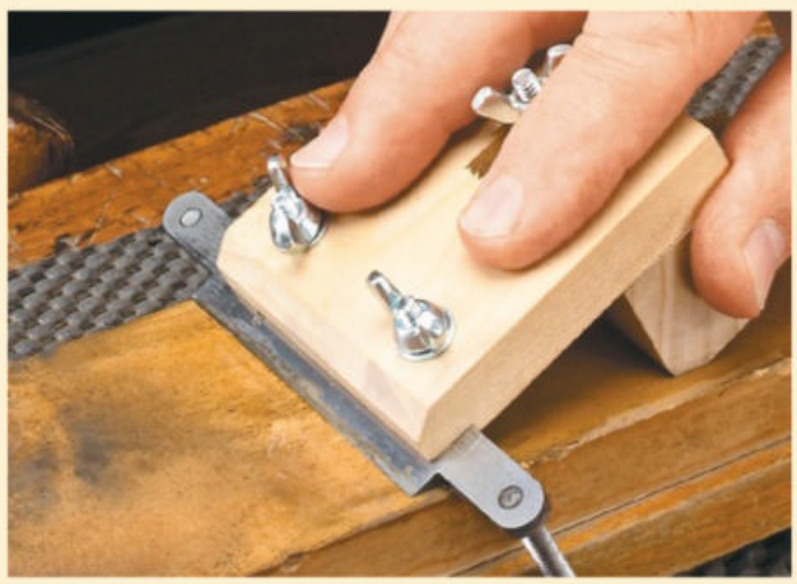
PUSH & PULL. I've found that a metal spokeshave works best when pushing it along the surface of the workpiece. My wood body shave can cut in either direction and usually depends on the material and task.

GRAIN DIRECTION. Just like with hand planes, you need to be aware of grain direction when using spokeshaves. This is especially the case when cresting the hill of a workpiece (upper left drawing) or the bottom of a valley. Here, the grain direction changes suddenly and you can easily end up with deep tearout. Pay attention and work from opposite directions as you approach these trouble spots. A card scraper and half-round file are better choices for working these transition zones.

No matter what, the spokeshave needs to be in top shape. For more info, check out the box below. So when you're ready to cut loose, pick up a spokeshave or a drawknife. With a bit of practice, you can take your skills to a new level. W

STAY SHARP!

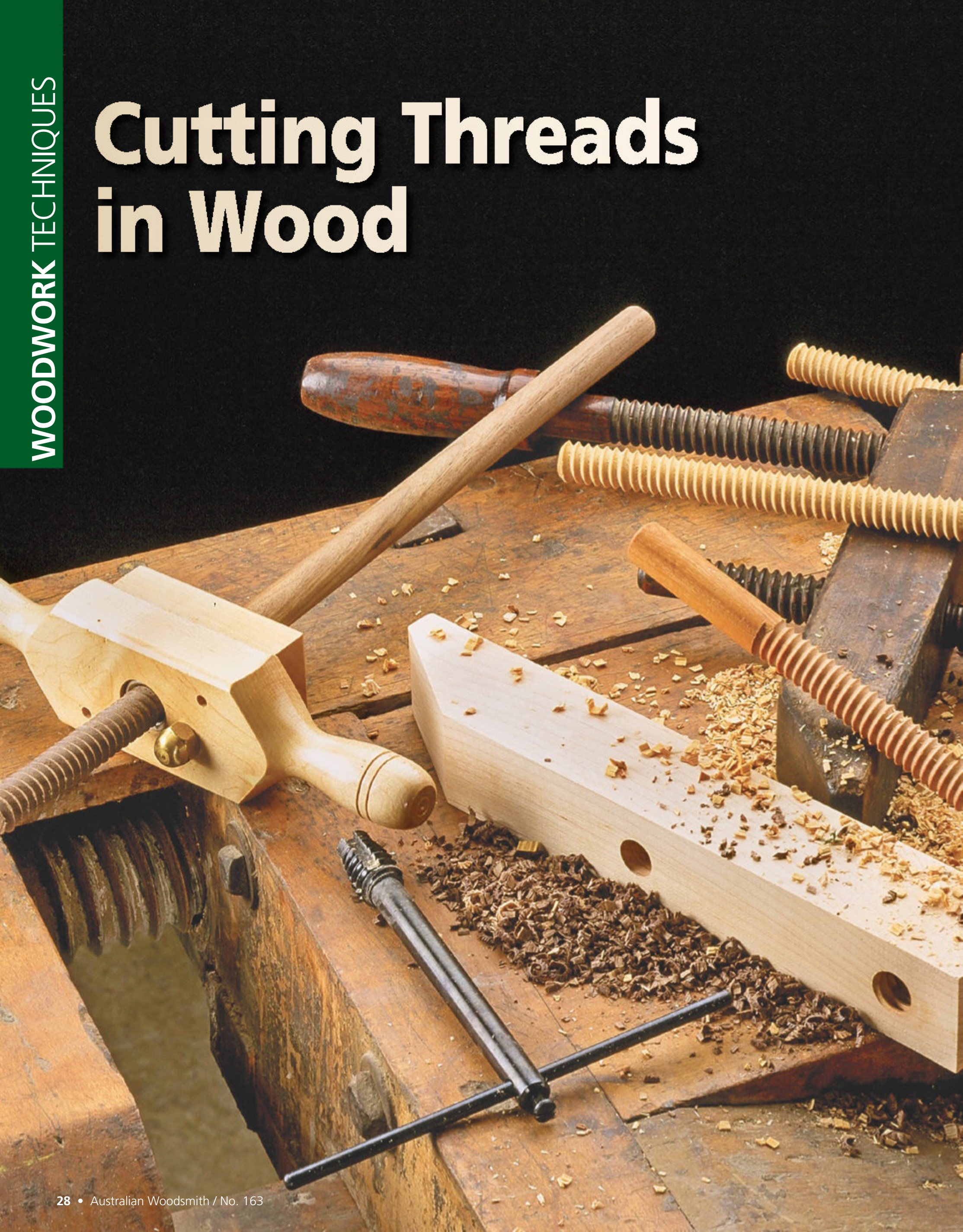
Like any edge tool, a spokeshave behaves best and is most enjoyable to use when the blade is razor sharp. The problem is the blades are small or narrow, so they won't fit in most honing guides. However, with a little ingenuity, some scrap material and a few pieces of hardware, you can make these helpers to keep your blades on the cutting edge.



▶ This guide grips the back edge of the blade for a wood-bodied spokeshave. The adjustable riser on the back finetunes the angle. The posts of the blade straddle most honing stones (see Workshop Shortcuts on page 59).

▲ A two-layer MDF block serves to "extend" the length of a metal body blade so you can hold it in a honing guide for fast, efficient sharpening.

Cutting Threads in Wood



As a kid, I spent hours opening and closing the vice on my grandfather's workbench. It had wood jaws, a wood handle and best of all, a large wooden screw.

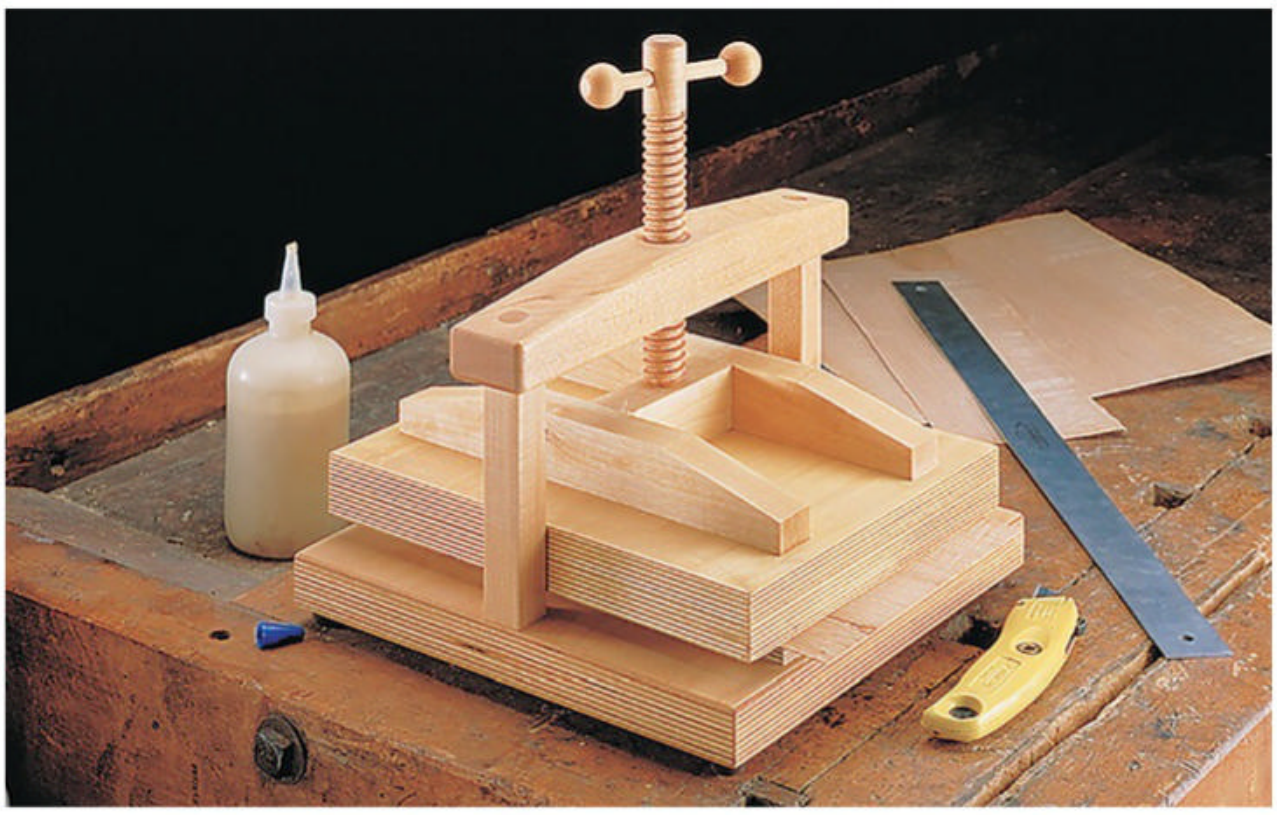
Ever since then, I've been fascinated by projects with wood threads. Deep, V-shaped threads spiral around the outside of a wood cylinder. And these threads mesh together with threads inside a hole (right photo below).

But to be honest, I've always been a bit intimidated about building a project that required cutting wood threads. To prevent the threaded parts from binding, the threads would have to be identical — inside and out. And that sounded complicated.

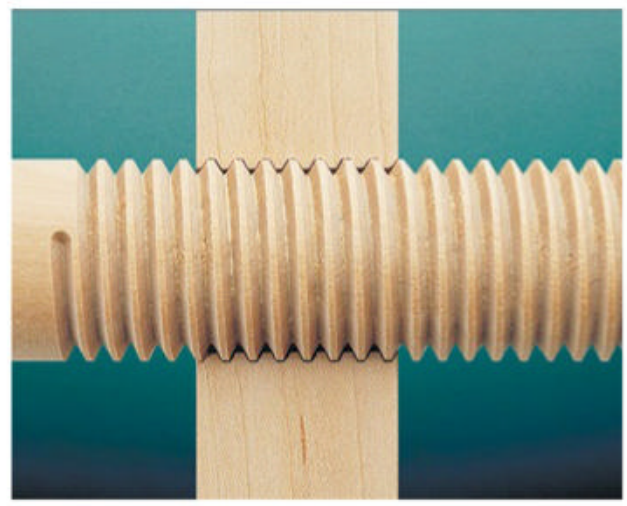
As it turns out, I was right about one thing. To get the threaded parts to fit together smoothly, the size and spacing of the threads does have to be fairly consistent. But cutting uniform threads isn't as difficult as it sounds. In fact, all you need are two simple tools.

TAP & THREADBOX. The inside threads are formed by drilling a hole and gradually twisting a tap down into it. (The tap is the metal tool with a T-shaped handle in the main photo.) To cut the outside threads, you spin a threadbox (the wood box with turned handles) around a dowel.

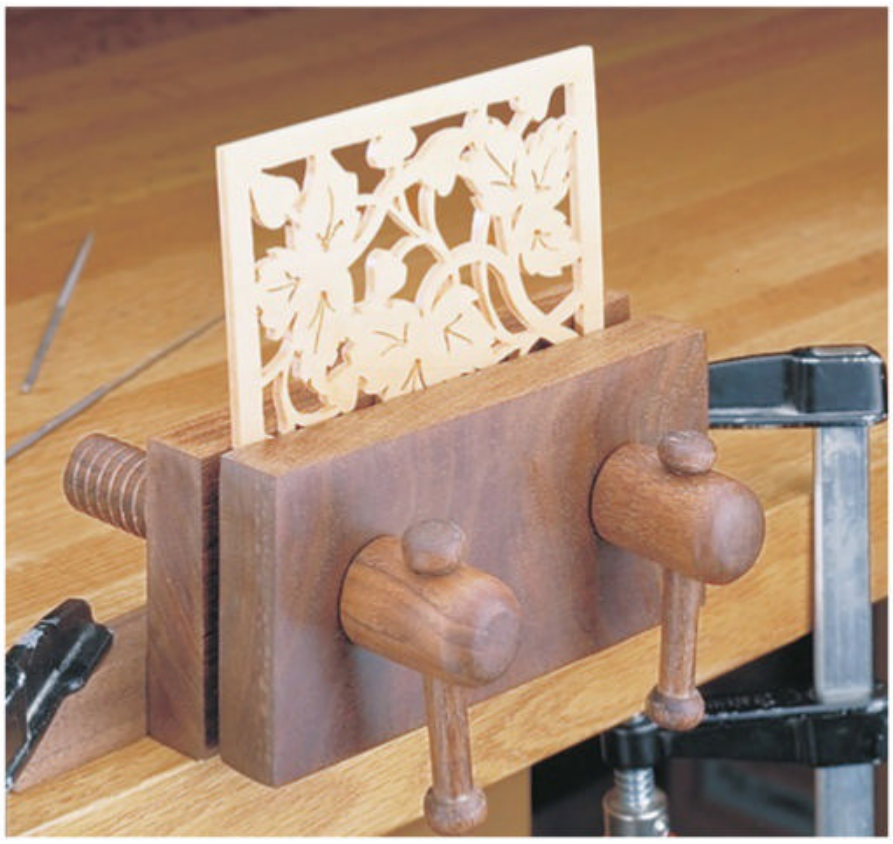
IMPERIAL SIZING. Threading tools are available as matched sets that range from ½" to 1½", refer to Sources on page 73. The size refers to the diameter of the dowel that can be threaded.



Veneer Press. Tightening a single wood screw applies all the clamping pressure that's needed for this small veneer press. With different sets of threadboxes and taps, you can make the wood screw in various sizes.

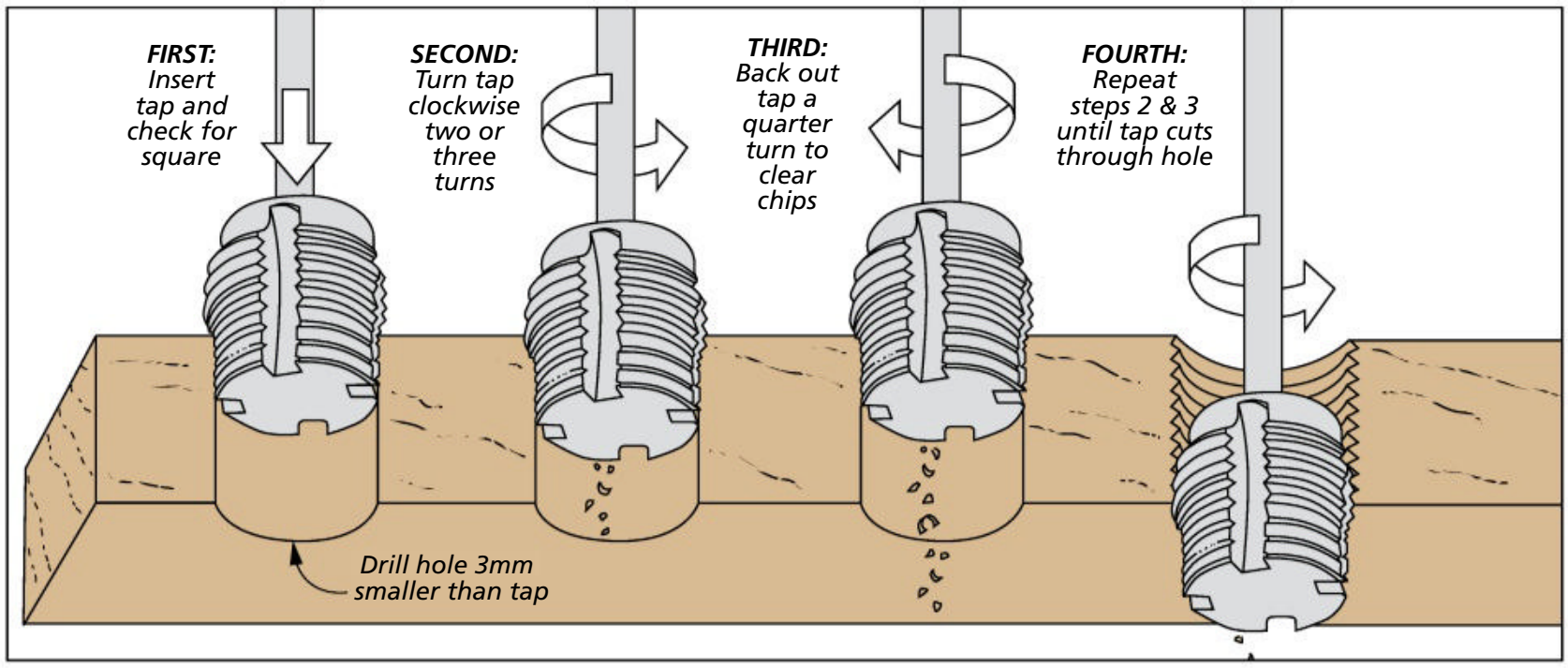


The threaded dowel must match the threads in the hole perfectly for a smooth, easy-to-use screw.



Benchtop Vice. The twin wood screws on this small, benchtop vice thread into tapped holes in the back jaw. Apply a couple of oversized caps and handles for a functional benchtop vice.

Small-Piece Clamps. Cutting small wood threads are ideal for small, delicate work such as these micro clamps. Just thread a short dowel and then tap threads in the lower nut.



INSIDE THREADS

I begin a threading project by cutting the inside threads with the tap, as in the photo at right. Later, this makes it easy to test the fit of the threads on the dowel and make any necessary adjustments to the threadbox.

PILOT HOLE. The first step is to drill a pilot hole for the tap. As a rule, this hole should be 3mm smaller in diameter than the nominal size of the tap. (For example, drill a 35mm hole for a 1½" tap.) This way, there's plenty of material left to cut away and form the threads.

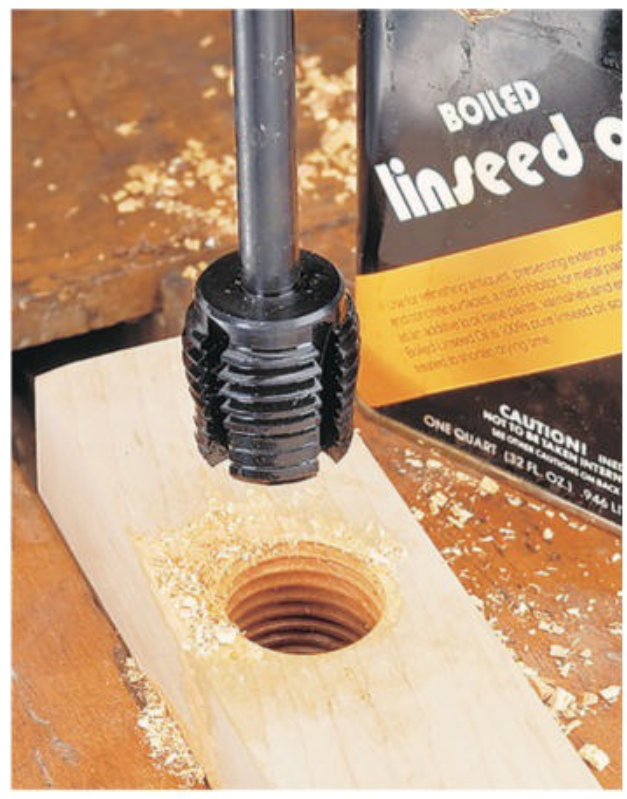
LUBRICATION. The tap will fit quite snug in the hole. So to make it easy to turn, it's best to apply a generous amount of oil. (I use boiled linseed oil.)

CUT THREADS. After letting the oil soak in, it's time to cut the threads. The bottom end of the tap has a slight taper that helps centre it in the hole, see first step in drawing above.

Even so, the important thing is to make sure the tap goes straight into the hole. (It will still cut if it goes in at an angle, but the dowel that threads into the hole will wobble or bind.) To accomplish this, twist the tap slowly and evenly in a clockwise direction, applying a small amount of downward pressure (second step).

At first, the tap will turn freely. But after a couple of turns, you'll start to feel resistance. At that point, back the tap out about a quarter of a turn to clear the chips, like you see in the third step.

Now, it's a simple matter of continuing to thread the hole all the way through the block, as shown in the fourth step.



▲ A sharp tap combined with a closed-grain stock leaves crisp threads ready for a mate.

SELECTING DOWELS

The secret to ending up with crisp, clean threads is selecting the right dowels. For starters, stick with close-grained stocks like radiata pine or Tasmanian Oak. Open-grained woods have a tendency to chip out.

STRAIGHT. You'll also want to check that the dowel is straight. It's difficult to cut consistent threads if it's bowed. (I roll the dowel across my bench to check straightness.)

SHAPE. The shape of the dowel is also important. As the wood dries, the dowel may go out of round. (You'll know by the egg-shaped ends.) These dowels feed crookedly through the threadbox.

SIZE. One final consideration is the diameter of the dowel. Many dowels are slightly smaller or larger than their stated size. So you may want to take the threadbox with you to the hardware store and check the fit.

OUTSIDE THREADS

Once the threads are cut inside the hole, you're halfway done. Now it's time to pick up the threadbox and cut the outside threads in the dowel.

TWO PARTS. The threadbox consists of two wood blocks that house a V-shaped cutter, see drawing below. The cutter fits into a notch in a threaded post. Tightening a nut on the end of the post locks the cutter in a "pocket" in the upper block.

Just a word of caution. The post is made of brass, so it's fairly soft. So to avoid bending (or breaking) it, be careful not to overtighten the nut.

METAL INSERT. The cutter is positioned right next to a metal insert in the upper block. This insert is threaded to match the threads cut by the tap. The reason is simple.

When you rotate the threadbox around the dowel, the cutter makes a groove that "catches" the threads in the insert. These threads then pull the cutter around the dowel. This creates a spiral groove in the tapped hole.

CHAMFER & OIL. To get the first thread started (and keep the fragile edge from chipping), I sand a chamfer on the end of the dowel. Here again, applying oil softens the wood fibres and makes it easier to cut the threads.

When cutting threads with the threadbox, use a quality dowel. As you start cutting, check the fit in the already cut hole and make adjustments as necessary for a perfect fit.

TEST CUT. The threadbox I used was already adjusted by the manufacturer. But it's still a good idea to cut threads in a scrap piece and check the fit of the dowel in the tapped hole.

Don't expect wood threads to fit as tightly as metal threads. (A good fit will seem a bit loose.) This prevents the threaded parts from binding when the wood expands or contracts with changes in humidity. Note: to improve the fit, adjust the depth of cut by sliding the cutter in or out.

CUT THREADS. Once you're satisfied with the fit, clamp the "real" workpiece vertically in a vice and lower the threadbox onto the end of the dowel. You'll feel a "thunk" as the cutter contacts the end of the dowel.

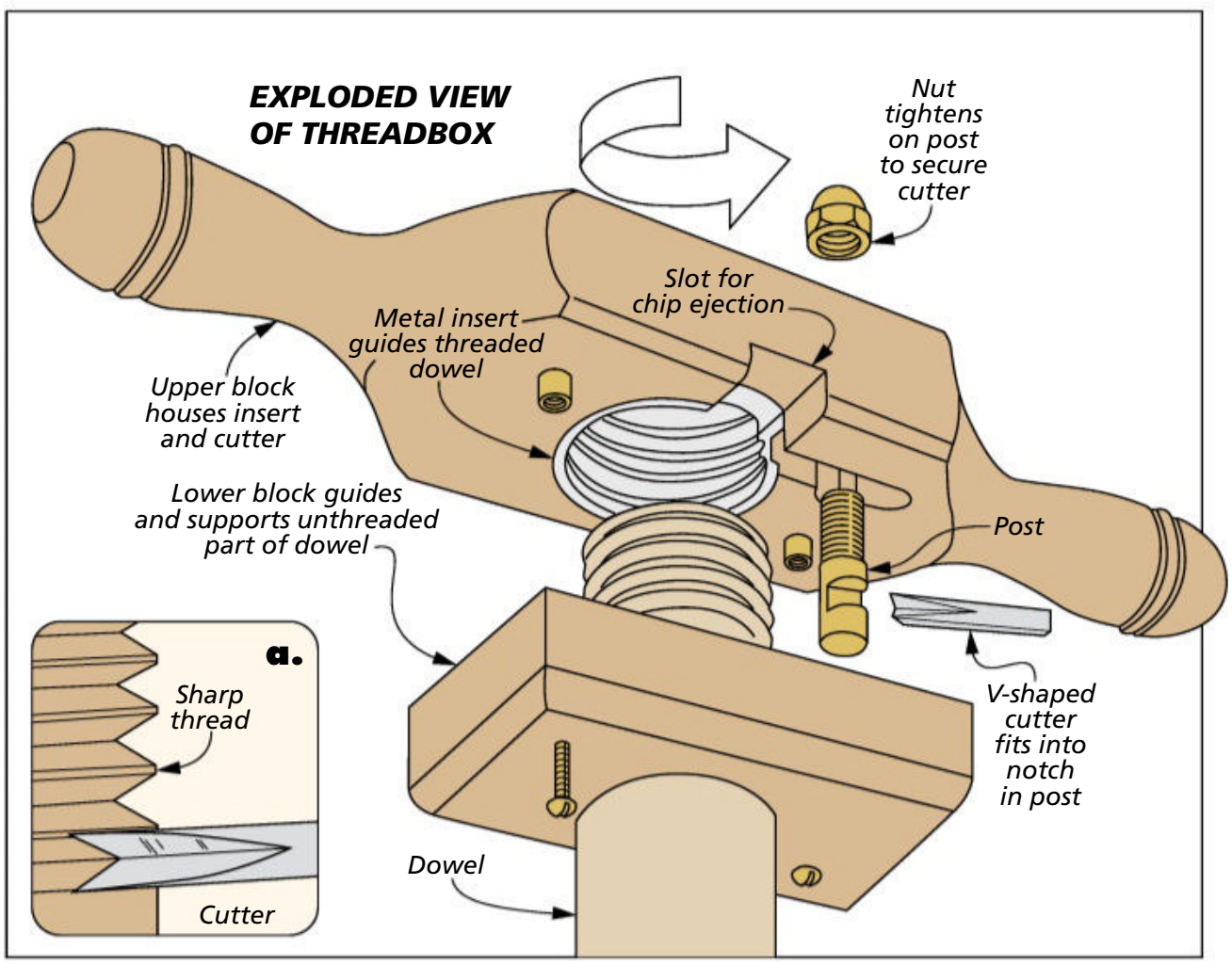
Now grip the threadbox by the handles and slowly rotate it in a clockwise direction. At the same time, apply steady, even pressure downward. There's not much resistance — about as much as using a corkscrew.

If the threadbox gets harder to turn, it's probably because chips have clogged the throat opening. To clear the chips, simply back off the threadbox about a quarter of a turn.

As you continue to turn the threadbox, it will work its way down the dowel, exposing the newly cut threads on the end.

THREAD SHAPE. The ridges on these threads are fairly sharp (detail 'a'). Because of this, they're a bit fragile, and they may chip with use. But that won't weaken the thread. The thick root of the thread that fits in the groove provides the strength.

UNSCREW THREADBOX. After you reach the desired length, back the threadbox off the dowel. Then run it back down one more time. I find this clean-up pass leaves the thread faces smoother and better-fitting.



Workshop Stool

Don't let the slender, graceful lines of this stool fool you. Solid construction makes it well-suited to stand up to years of use in your workshop.

Working in a small workshop, I used to view a workshop stool as just one more thing to get in the way of getting a job done. But as I've aged, I've come to appreciate having a stool more and more. And not just for sit-down tasks. Having a place to take a load off your feet for a few minutes really does make spending long stretches of time in the workshop more bearable, as well as enjoyable.

This is not just a workshop stool, however. The casual styling makes it suitable for a kitchen island or tall table, as well. Plus, you'll have the satisfaction of making it yourself. Ours is crafted from walnut and hickory, but just about any stock will do. And as an added bonus, this project is a great excuse to build the shaving horse on page 42. Or maybe it's the other way around. Building the shaving horse gives you an excuse to make a few of these stools.

Making the **SEAT**

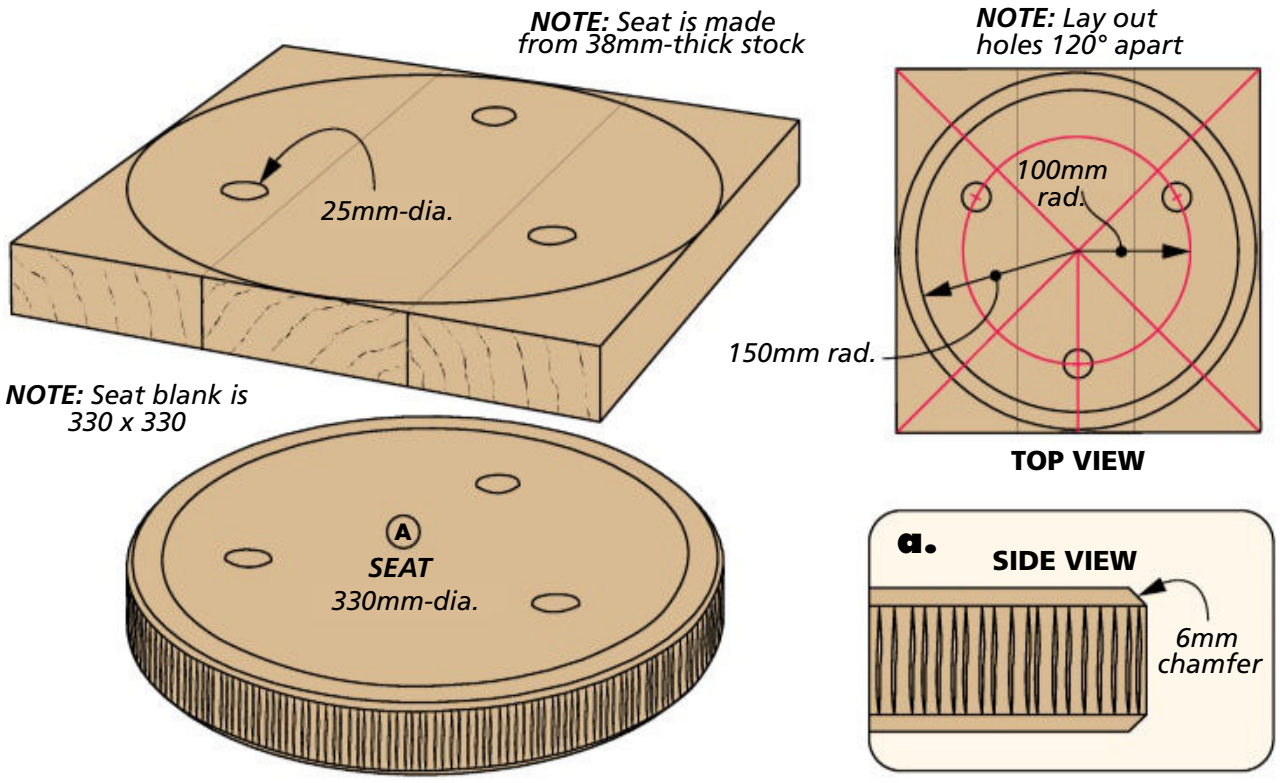
Most of the work involved in making this stool goes into the seat. The seat starts out as a square, glued-up blank, as shown at right.

MORTISES. I laid out the mortises for the legs of the stool by first drawing diagonal lines on one face of the blank to locate the centre. Then after using a compass to draw a circle, I used the same compass setting to step off three equally spaced points on the circle for the mortise locations. The top view in the right-hand margin shows the location of these.

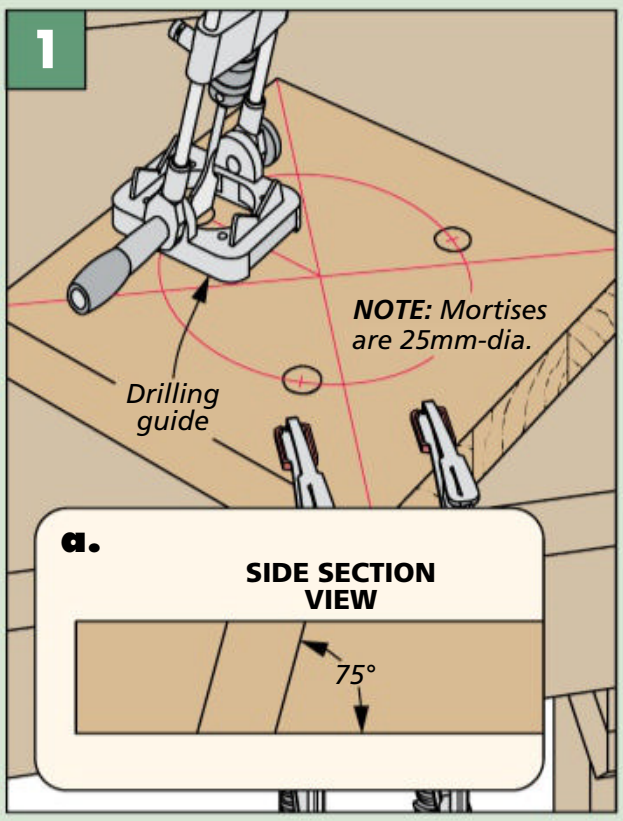
The mortises are nothing more than holes drilled at a 15° angle. As you can see in Figure 1 below, I used a drilling guide for this step. If you don't own a drilling guide, you could drill these by hand using a bevel gauge as a guide to help you hold your drill at the proper angle.

SHAPING THE SEAT. With the holes drilled, you can cut the seat to shape at the bandsaw. To create a more comfortable surface, I hollowed out the top of the seat slightly using an angle grinder and a special shaping disc, as shown in Figure 2.

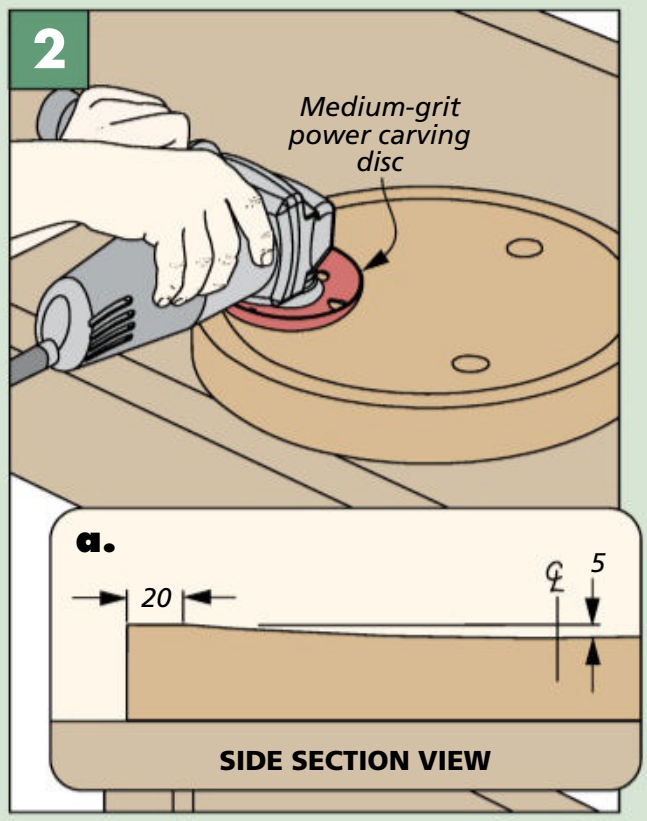
REEDING. For a decorative touch, I added a carved detail to the edge of the seat, as shown in detail 'a' above. Start by pencilling in some layout lines all around the seat to establish the spacing. Then simply cut a series of shallow grooves using a V-gouge, just as you see in Figure 3 below. Don't worry about making these grooves perfectly parallel. A little inconsistency will simply add to the hand-crafted look. Once this is done, chamfer the top and bottom edges of the seat.



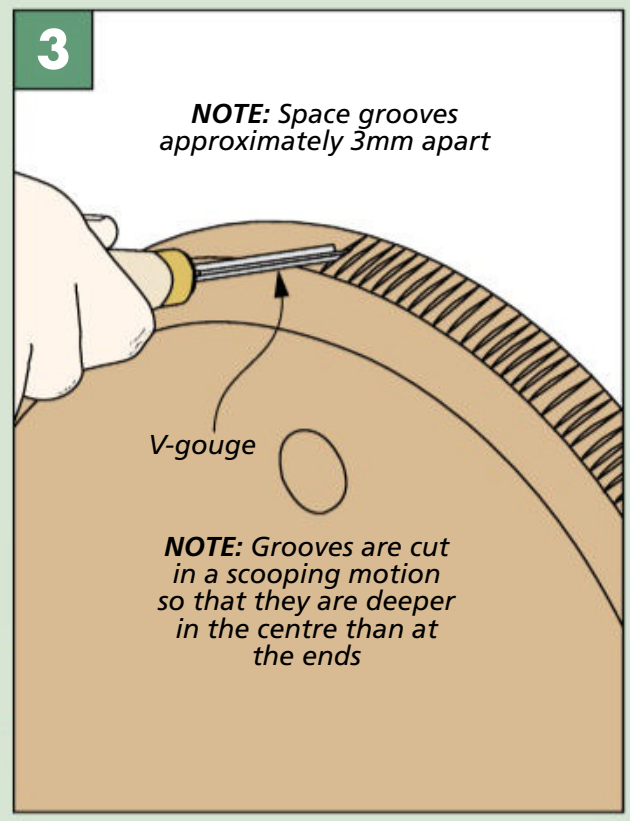
SEAT SHAPING DETAILS



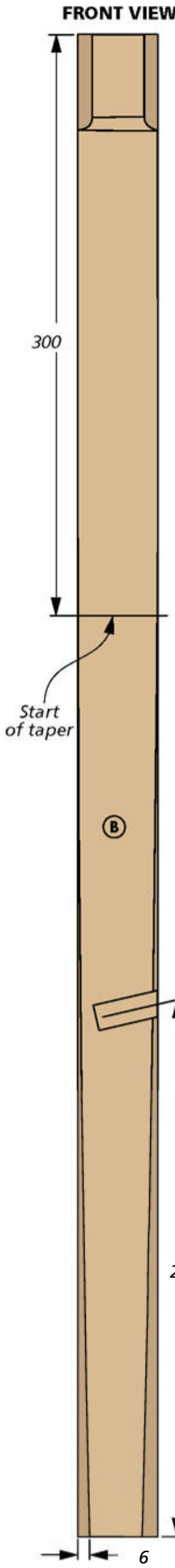
Drill Mortises. Using a drilling guide, drill the mortises at a 15° angle, referencing off the centrepoint of the blank.

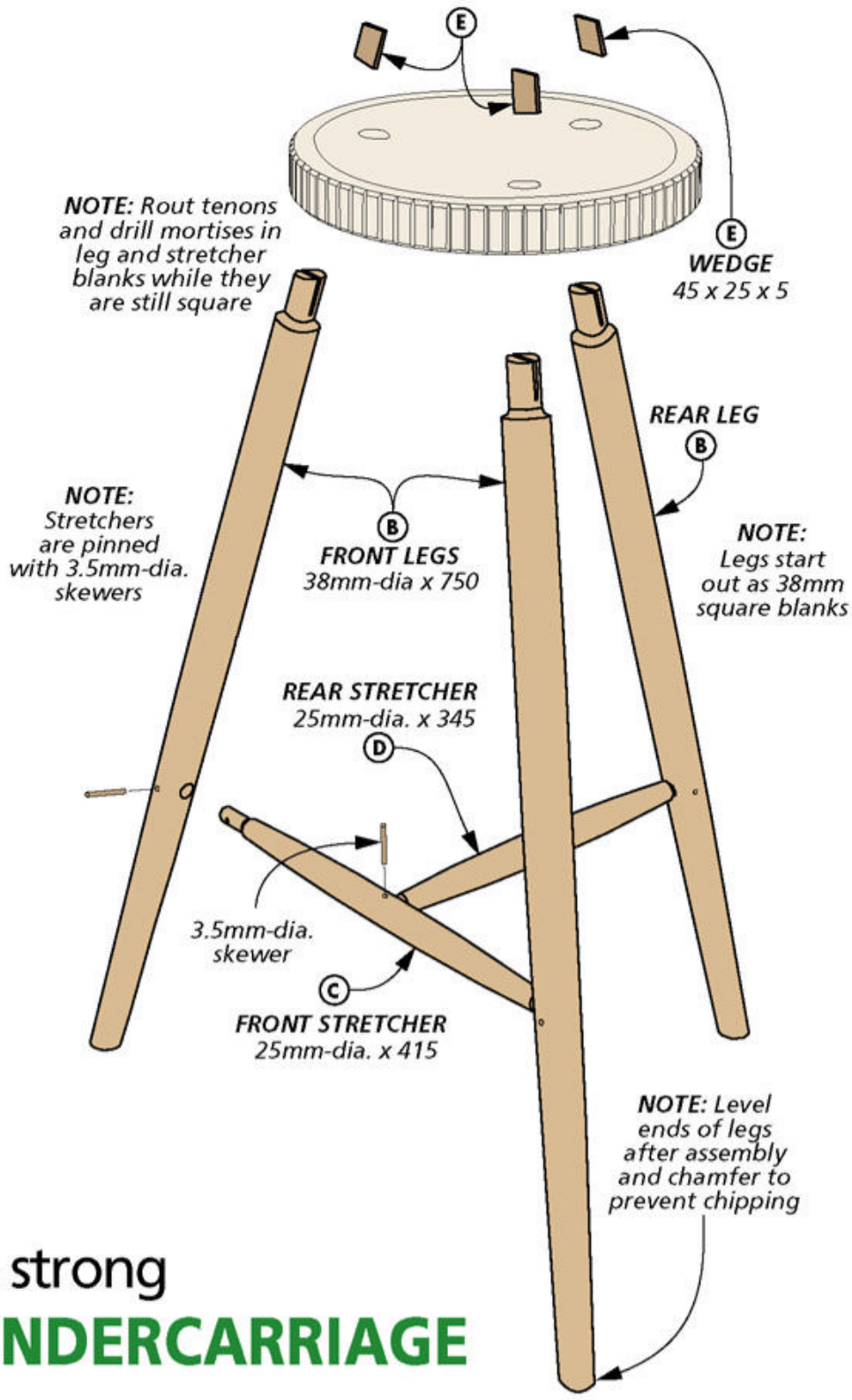


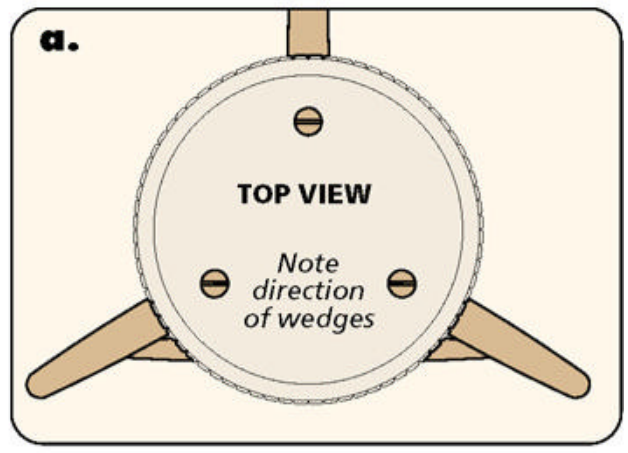
Hollow the Seat. A power carving disc (refer to page 73 for sources) makes quick work of dishing out the seat.

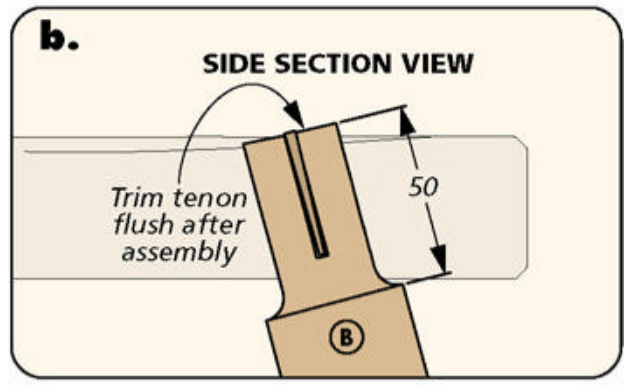


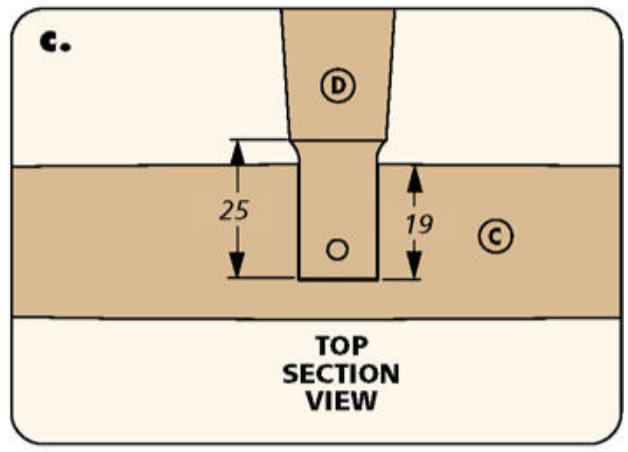
Add Reeding. A V-gouge is used to carve a series of decorative grooves around the edge of the seat.











A strong UNDERCARRIAGE

With the seat wrapped up, you're ready to start making the legs and stretchers for the stool. As you can see in the drawing above, these parts are about as basic as it gets. They're all just straight, round, tapered pieces. The real challenge comes in fitting them all together.

START WITH THE LEGS. I started with the legs. All three legs are identical in size and shape. The only difference between them is the mortises for the stretchers. Each one begins as a square blank cut from 38mm square stock.

I took care of the tenons on the ends of the legs as well as the mortises for the stretchers while the blanks were still square. As you can see in Figure 1 on the next page, the tenons are made at the router table using a core box bit and a jig to hold the blank.

The mortises for the stretchers are up next. Like the mortises in the seat, these mortises for the stretchers are drilled at an angle. But this time, I opted to drill them at my drill press, tilting the drill press table to achieve the correct angle. Figure 2 shows how this is done.

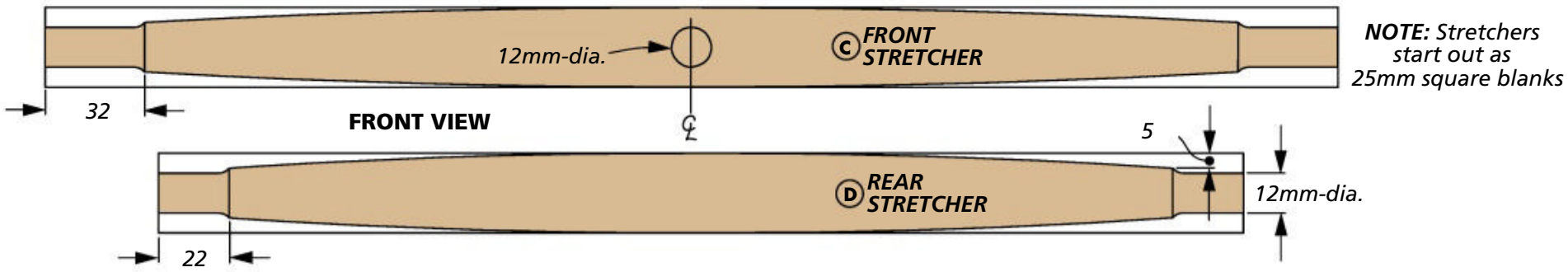
One thing to note here is that the mortises in the two front legs are drilled at 13° while the mortise in the rear leg is drilled at 15° (Figures 2a and 2b).

With the mortises out of the way, you can round and taper the legs according to the dimensions shown in the drawing at left. Here is where the shavehorse comes into play (along with a drawknife and spokeshave). Once the legs are shaped, set them aside for now while you work on the stretchers.

MOVE ON TO THE STRETCHERS. Making the stretchers is pretty much like making the legs. They both start off as square blanks. After routing tenons on the ends, you'll drill a mortise in the centre of the front stretcher to hold the rear stretcher. This mortise isn't angled, so there's no need to tilt your drill press table.

The stretchers are also shaped on the shavehorse, but these pieces are tapered at both ends. The drawing at the top of the next page will give you an idea of the basic profile to aim for.

ADD SOME WEDGES. To reinforce the joints between the seat and the legs, I added some wedges (detail 'b' above). After dry assembling all the parts, mark out the wedge orientation on the tenons, as shown in detail 'a' above.

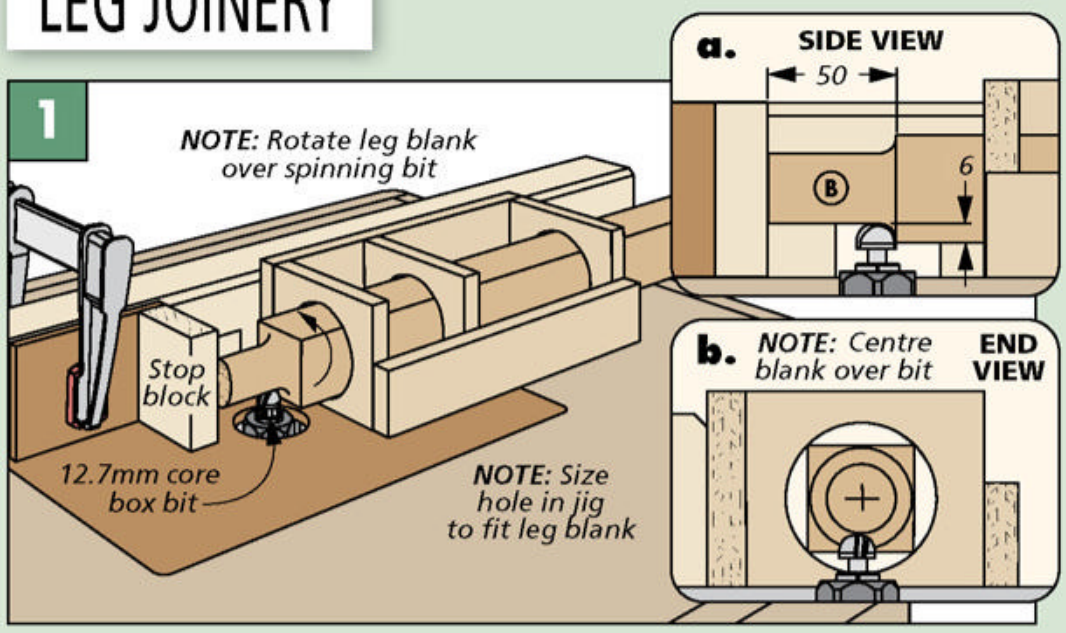


The kerfs for the wedges are cut at the table saw. Fig. 3 shows how I used a support block with a hole in it to hold the leg on end as I made the cut. The wedges are simply cut from some scrap at the bandsaw.

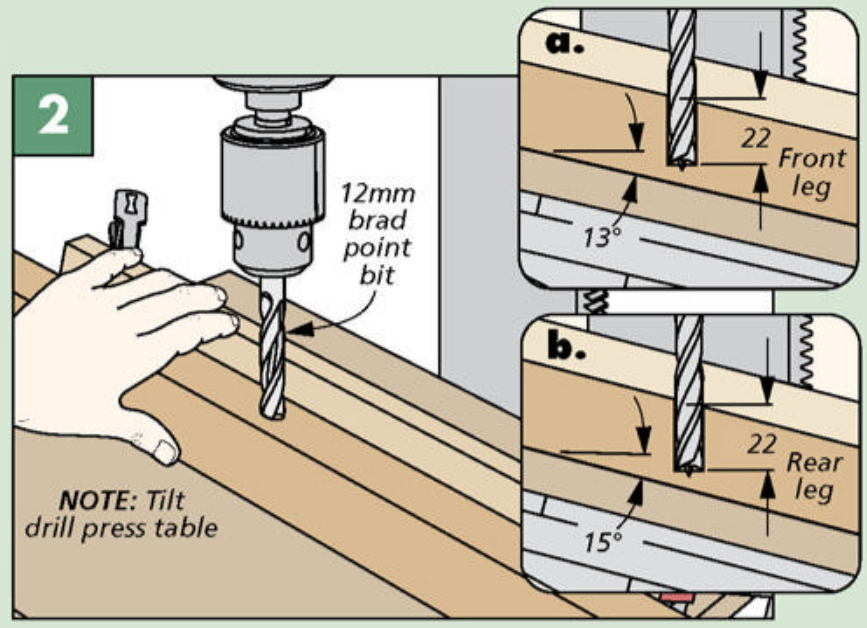
After gluing up the stool and adding the wedges, you can trim the leg tenons and scrape and sand them flush with the seat. The bottoms of the legs should also be trimmed and sanded so the stool sits flat.

DOWEL PINS. Finally, to reinforce the stretchers, I pinned the tenons of each joint with bamboo skewers, as shown in Fig. 4 below. Then after applying an oil finish, the stool is ready to take its place in your workshop. W

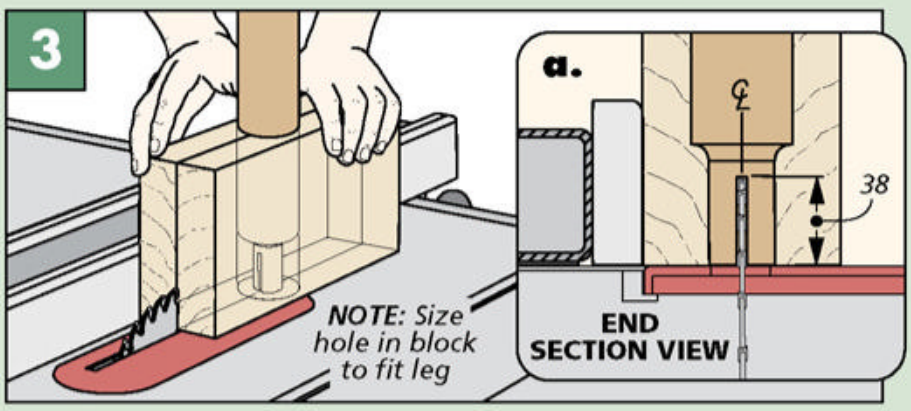
LEG JOINERY



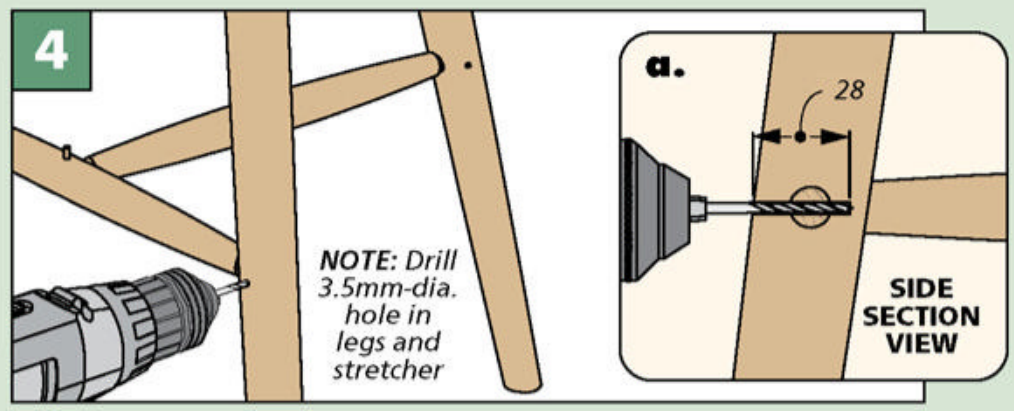
Turn the Tenons. A jig holds the blank, allowing you to rotate it to turn the round tenons. A stop block controls the length of the tenon.



Drill Mortises. To drill the angled holes for the stretcher mortises, tilt the table of your drill press.



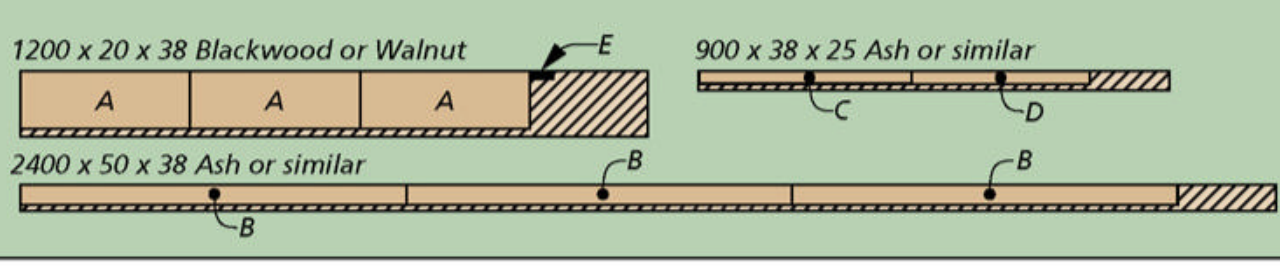
Wedge Kerfs. A large block with a hole supports the leg on end and guides it over the blade to cut the kerf.



Pin the Joints. To reinforce the stretchers, drill a hole through the leg and into the tenon. Then pin the joint with a bamboo skewer.

Materials, Supplies & Cutting Diagram

A	Seat (1)	330 x 330 x 38	**D**	Rear Stretcher (1)	345 x 25mm-dia.
B	Legs (3)	750 x 38mm-dia.	**E**	Wedges (3)	45 x 25 x 5
C	Front Stretcher (1)	415 x 25mm-dia.	•	(4) 3.5mm-dia. x 200 Bamboo Skewers	



NOTE: Go to Workshop Notebook on page 58 for plans to build the tenon jigs.

Twisted Dovetails

John Bullar shows us how to make this unusual but useful joint.

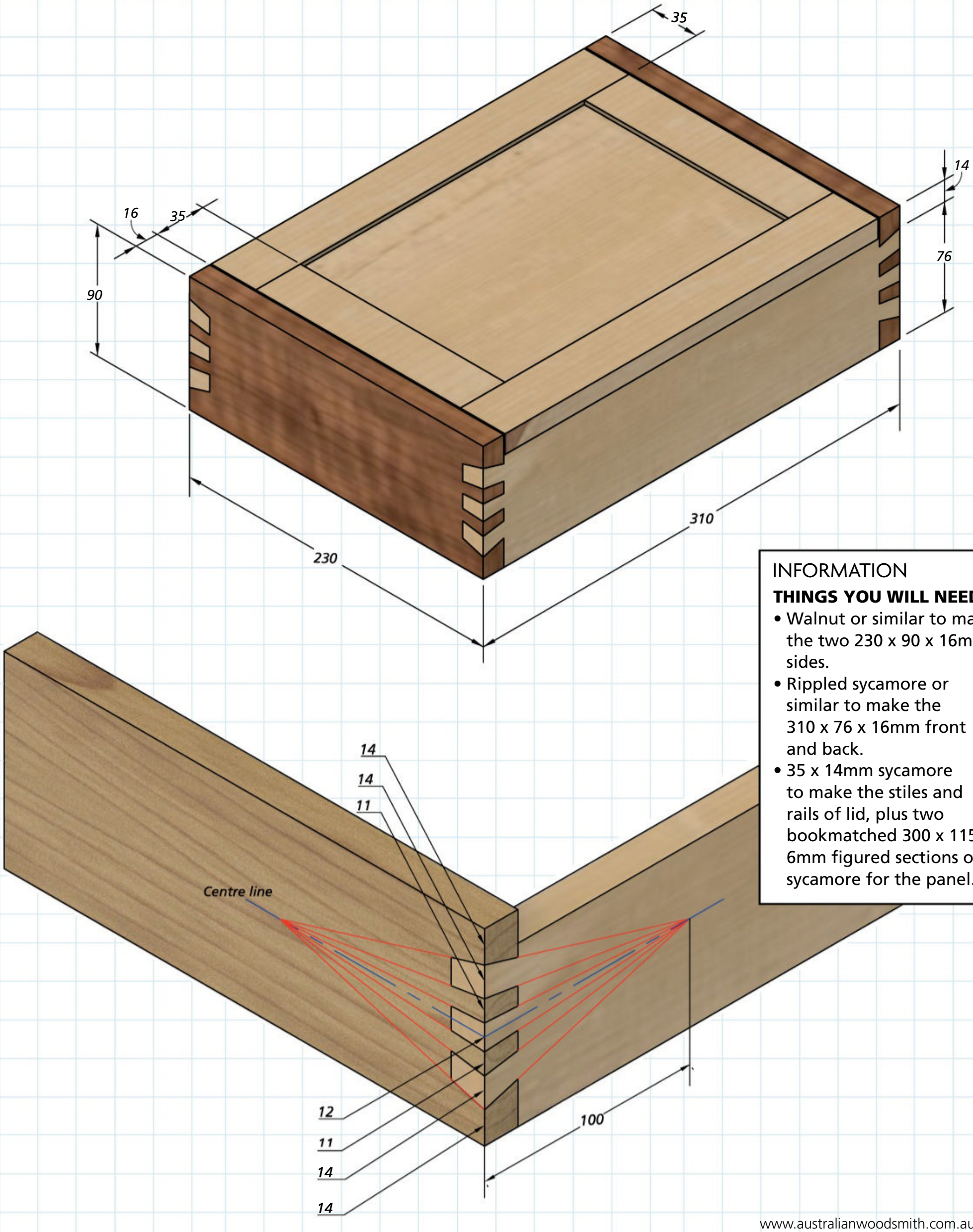
The twisted dovetail is a joint that gets people scratching their heads because even some experienced woodworkers cannot see how it is made until they've had a good think about it. But this joint is more than just a puzzle. It is immensely reliable and strong in both directions – especially good for holding boxes together.

WHAT IS A TWISTED DOVETAIL?

The twisted dovetail joint is locked together both sideways and endways – so you might ask how it fits together in the first place. To make it easier for me to explain how to cut and then fit this joint, I decided to show you a simplified version of it first, with just one pin in one socket. After that, I will show you how I incorporated rows of twisted dovetails in a fine jewellery box.

PHOTOS: JOHN BULLAR

Construction Overview / **OVERALL DIMENSIONS:** 310mm L x 230mm W x 90mm H



INFORMATION

THINGS YOU WILL NEED

- Walnut or similar to make the two 230 x 90 x 16mm sides.
- Rippled sycamore or similar to make the 310 x 76 x 16mm front and back.
- 35 x 14mm sycamore to make the stiles and rails of lid, plus two bookmatched 300 x 115 x 6mm figured sections of sycamore for the panel.

A one **PIN JOINT**

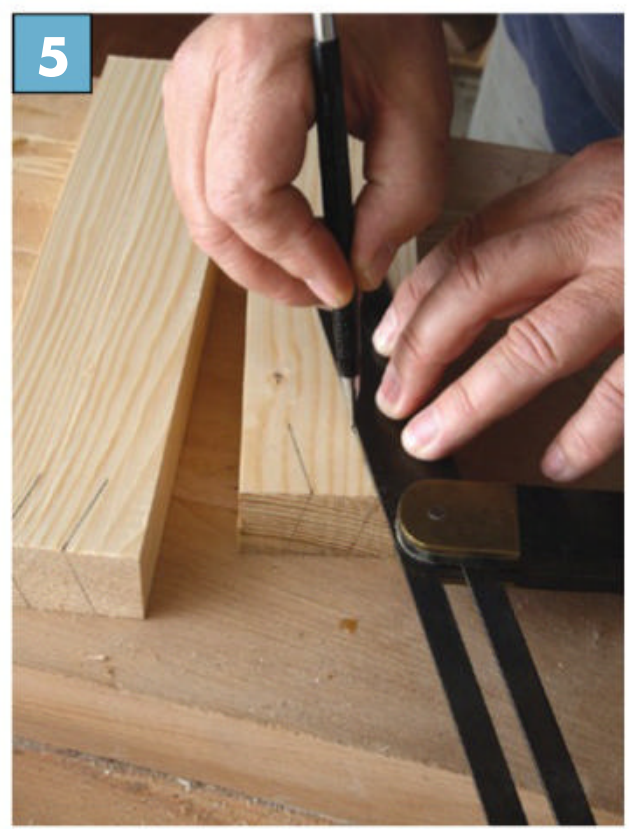
1 For comparison, look at this normal dovetail joint – it is securely locked together endways, but without glue, you can easily pull it apart sideways. This is no problem for a drawer which slides in a chest, but bear in mind that a box made with ordinary dovetails is only held together sideways by friction and glue.

2 Start the twisted dovetail by squaring the ends of the wood. For this joint to fit properly, both pieces must be the same thickness.

3 Match up the position of each shoulder line to the thickness of the wood. Mark the shoulder line all around one piece of wood which will form the pin, and just on the two wide faces of the piece that will form the socket.

4 Line the two pieces up end to end, then mark the outer corners of the pin and the socket together using a thin pencil line.

5 The easiest way to mark the sides of the pin and socket is to use an angled bevel gauge. Alternatively, you might use a dovetail gauge, or a ruler and a protractor. In any case, the angle across the sides and end of the tail must be identical to each other, and to the angle across the side and end of the socket.



Sawing **THE JOINT**

6 The best way to saw the sides of the pin is to clamp the wood at about 45° in a vice. That way, you can look down on both the end and the face of the wood at the same time and make sure the saw follows both lines at once. Use a dovetail saw or a small tenon saw.

7 Clamp the wood sideways, then follow the shoulder lines as you saw away the waste from each side of the socket.

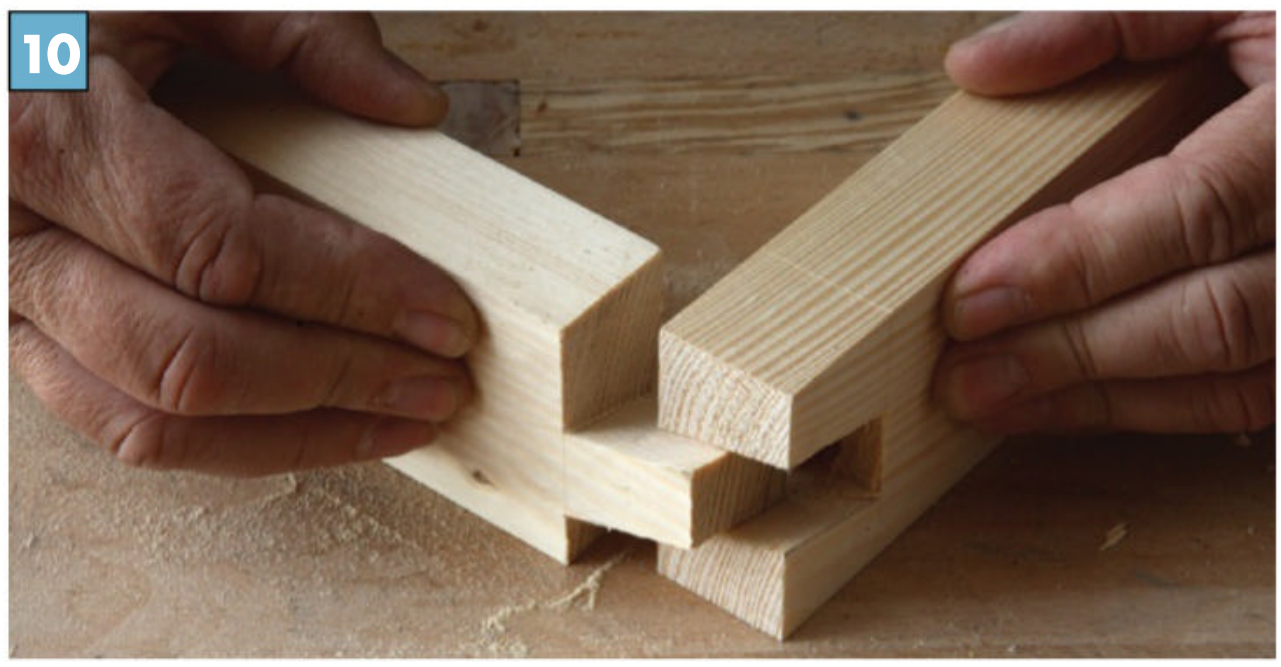
8 Clamp the second piece of wood upright in a vice and then use a coping saw to saw out waste from the base of the socket.

9 Use a sharp bevelled edge chisel to clean the socket down to the shoulder line.

Fitting **ONE PIN**

10 To fit the joint, both sides need to be pressed together at once. The pin slides into its socket at precisely 45° while the two pieces of wood must remain at right angles. Making a single joint with a single pin gives us a bit of leeway here, but it's good practice.

This really is a puzzle joint. Later (when you have the four sides of a box to assemble) you need to manipulate each joint at the same time so that each corner slides into place.



Row of **TWISTED DOVETAILS**

11 I started this box by preparing planed edges and dimensioned parts from rippled sycamore and walnut. For each joint, lay out the two pieces of wood end to end, and mark the outer corners of the pins and sockets.

12 Use a fine marking gauge to mark the socket depths. The bases of the sockets are marked to the thickness of the wood in the same way as you would when making through dovetails.

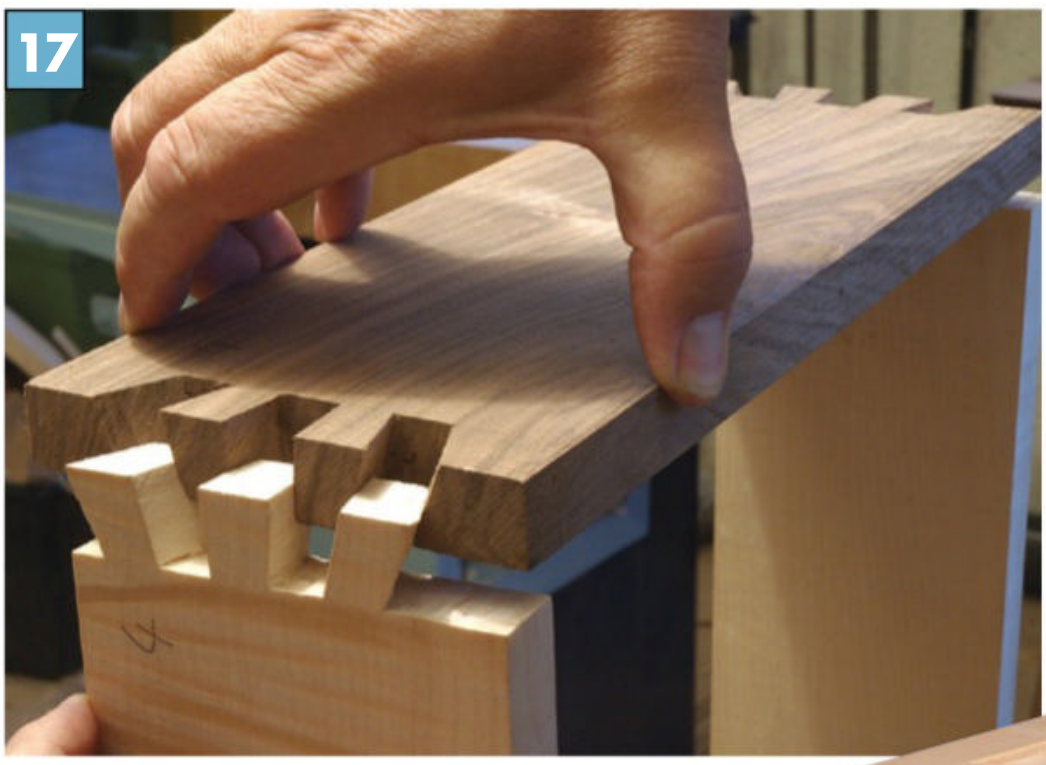
Sunray **PATTERN**

13 You can use any angle for the side of a pin, so long as you copy the exact same angle onto the end grain of the pin and the side and end grain of the socket. Use a sliding bevel gauge to transfer the angles between face and end grain, making the same marks for both the pins and the sockets. The twisted dovetails I used on this box make a sunray pattern joint. To mark this pattern, vary the angles across the joint so all the lines meet at the same vanishing point (mine was centred 100mm from the end).

14 It's a good idea to mark the waste pieces with crosses before you saw any pins or sockets. Clamp the timber in a vice at 45° so you can see both faces at once. Saw the sides of the tails with a fine saw, being careful that the kerf just meets the line.

15 Remove the socket waste with a coping saw or fretsaw. Shoulders are cleaned with a chisel in the same way as for through dovetails.

16 Repeat the joint for all four corners of the box, copying the angles from the first joint each time.



Assembling FOUR JOINTS

17 The joints on each corner must slide together at 45° while the pieces of wood are held at 90°. This means that the four sides of the box need to be squeezed together in one operation, otherwise the last joint will not fit without distorting the others. Once twisted dovetails are closed up tight, even without glue they are extremely difficult to separate without causing damage. Engage the tips of the pins in their sockets, then sight across each joint at 45° to check the fit by eye.

18 Once you are happy that the joints are aligned, use a fine brush to glue the pin and socket internals before squeezing all four joints together. When the glue is set, chamfer the edges before planing the joint flat and smooth. Chamfers are more than just decorative – they allow you to plane off the edge of a joint without splintering the end grain.

19 After fine planing this twisted dovetail box, the walnut and rippled sycamore was sealed with shellac and then waxed. W

Multi-Function Shavehorse

No, this isn't a woodworking rowing machine. This traditional device helps you get the most from hand tools.

There's a branch of the woodworking family tree that begins, well, with a tree. Log sections are split and shaped into rough blanks while the wood still contains a good amount of moisture. Working "green wood" with hand tools is easier than hard, dried wood. Green woodworkers shape the parts into chairs, stools, spoons, bowls and more.

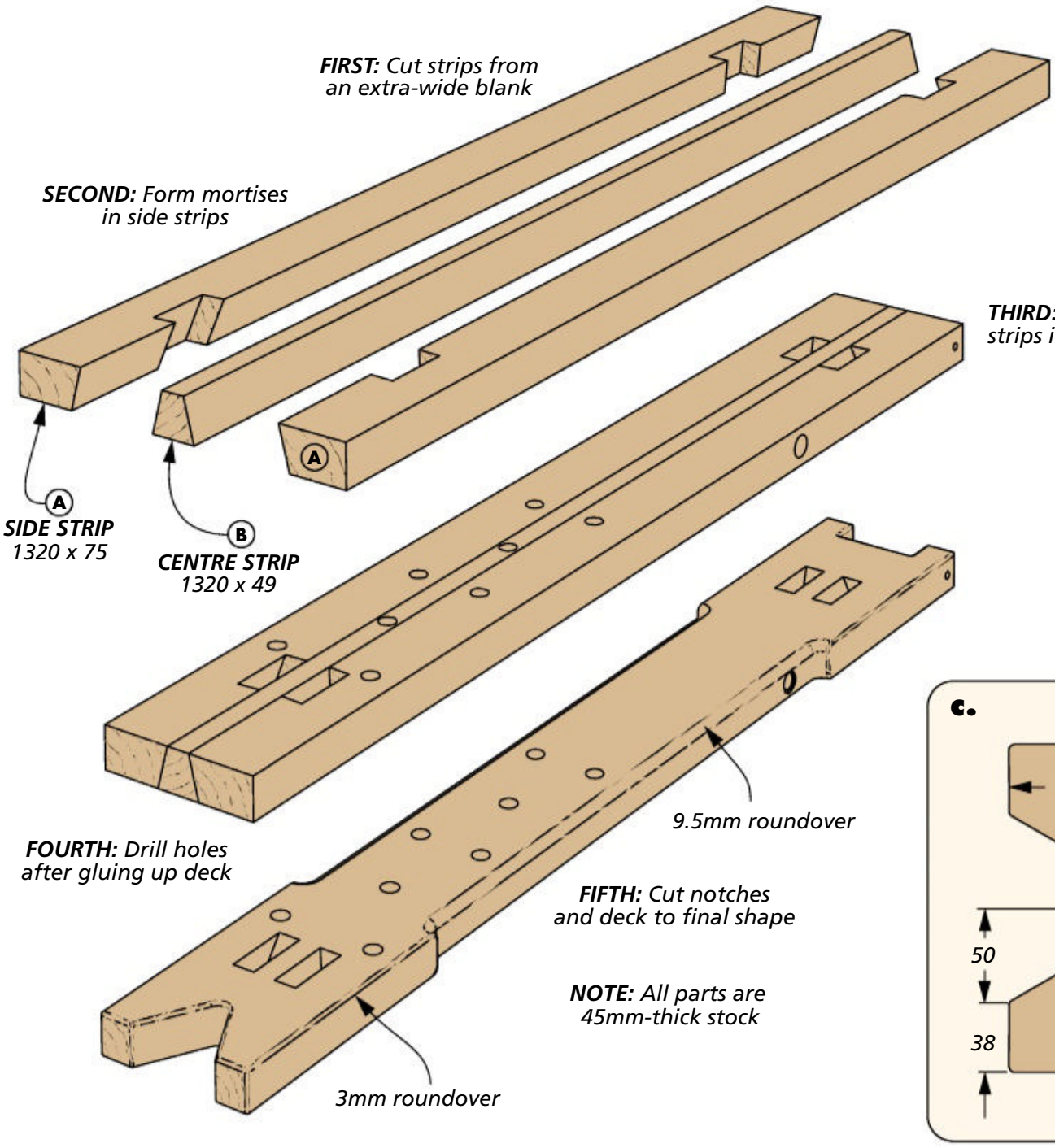
Working with parts that aren't flat, straight and square requires a different mindset and employs some tools you may not be familiar with. One of those is a shavehorse. It's equal parts workbench, vice and workshop chair all rolled into one. And it's used to hold odd-shaped workpieces while you work them.

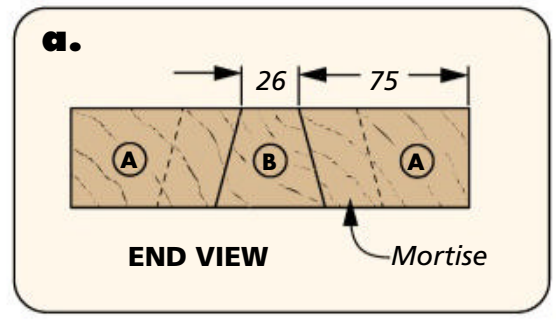
To secure a workpiece, press against the foot pedal. The upper jaw clamps down on the piece locking it in place. Repositioning the part only requires you to release the pressure from your feet. This arrangement works well with the two tools most often associated with shavehorses: a drawknife and a spokeshave. The pulling stroke of the tool works in concert with the pushing effort from your feet. The harder you press, the stronger the vice action. It's very efficient and fun to use.

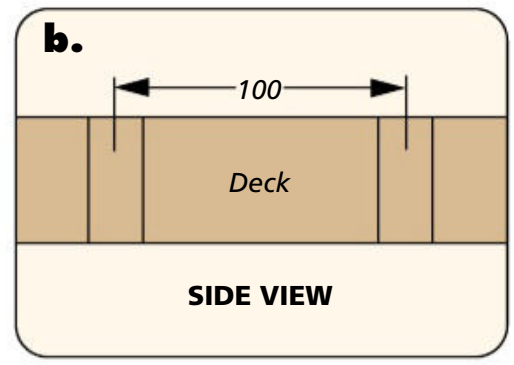
The main difference between this and other shavehorse designs is the addition of the adjustable vice screw on top. This accommodates different sizes of workpieces with a few turns of the handle. The seat also serves as a sawhorse and worksurface.

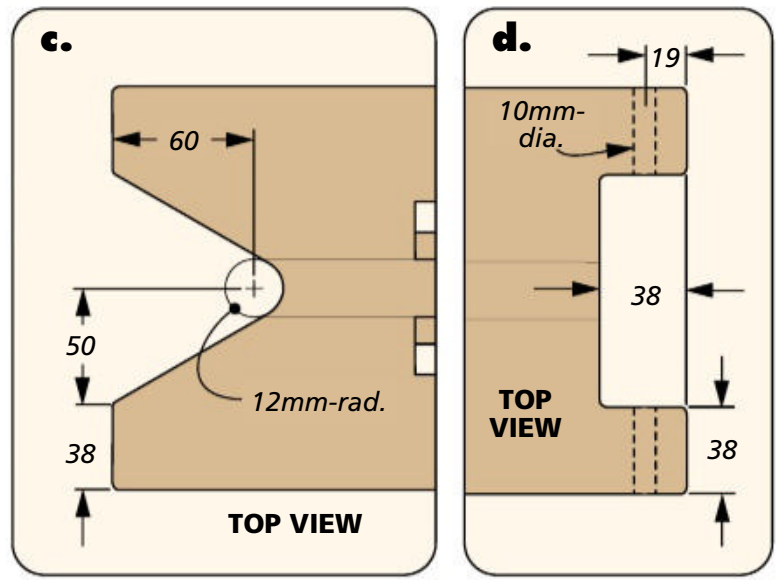
A wood clamp screw controls an adjustable jaw that makes it easier to work with different-sized workpieces. An article on page 28 shows you how to cut threads in wood.

The shavehorse doubles as a sawbench for other hand tool operations like using a hand saw. A V-notch supports workpieces for ripping. Bench dog holes work with hold-downs for securing project parts.









Multipurpose DECK

A shavehorse leans more heavy towards hard-working practicality than appearance and presentation. So I made this one out of clear pine. It's easy to work, strong enough and economical. The starting point is the long deck that serves as the seat, worksurface and pivot point for the built-in clamp.

While it ends up as a single piece, the deck starts as three narrow strips (drawing above). The pieces are bevelled on the mating edges, as you can see in Figure 1 on the next page.

MAKING MORTISES. The reason for this is to simplify forming the splayed and raked mortises for the legs. The bevelled edges of the centre strip create one angled side of the mortise. The other side is made using a dado blade with an angled mitre gauge, as illustrated in Figure 2.

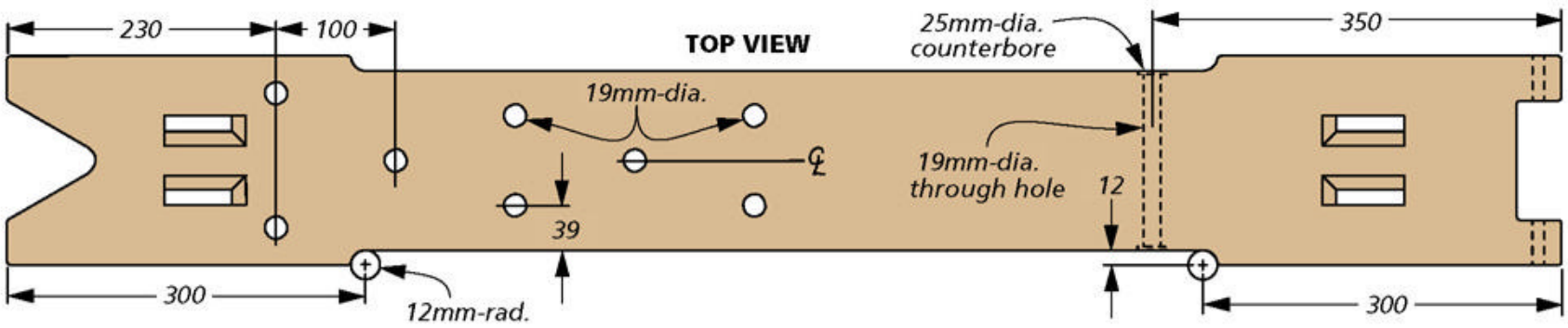
I want to pause and point out that since the mortises are raked and splayed, you'll be creating mirror image pairs of mortises in the side strips. For the opposite pair, you need to rotate the mitre gauge in the opposite direction.

Completing the mortises allows you to glue the deck into a single unit. Figure 3 shows how to keep it flat.

DRILLING HOLES. Don't get carried away with cutting the profile of the deck just yet. There are two holes drilled through the edge of the deck that are better drilled while the piece is still square. These are used to attach the foot pedal and clamp mechanism and the front edge of the table (detail 'd' above).

The pivot hole has a shallow counterbore on each side (once the deck is cut to final shape) to house a flanged bearing. I chose to drill these at the drill press, as shown in Figure 4.

Since the deck is so wide, you'll need to drill from each edge. Clamping a fence on the drill press table helps align the holes. To drill the second part of the hole, all you need to do is flip the piece around, keeping the same face against the fence.



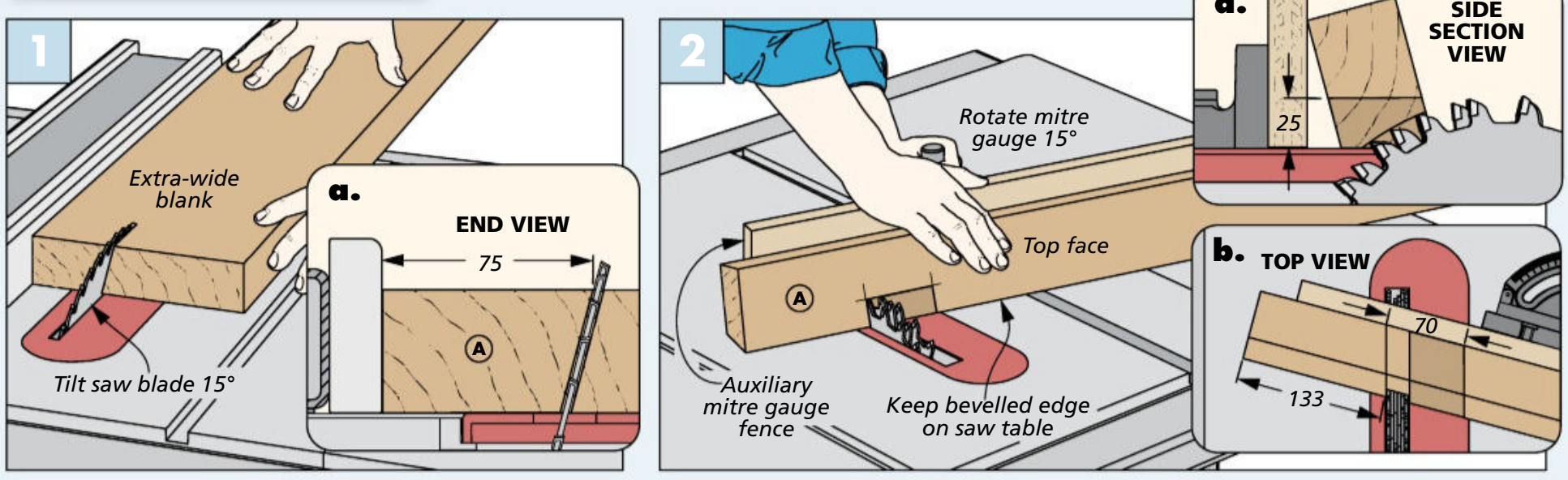
TWO NOTCHES. Each end of the deck is notched, but for different reasons. The front is notched to accept the front leg of the table you'll add later, as in detail 'd' on the previous page. In keeping with the hand tool nature of the project, you can cut the sides of the notch with a hand saw. Cut along the baseline with a coping saw and clean up with a chisel and file. A jig saw would complete the whole job just as well (I won't judge).

The notch on the opposite end of the deck takes a different shape. It's V-shaped (as in detail 'c' on the previous page) to support a board during rip cuts with a hand saw. For this, I drilled out the root of the V then cut the sides with a hand saw.

RELIEVED SIDES. The long edges of the deck are cut narrower to make it more comfortable to sit on the shavehorse, as shown in the drawing above. Once the sides are cut out, you can round over the edges.

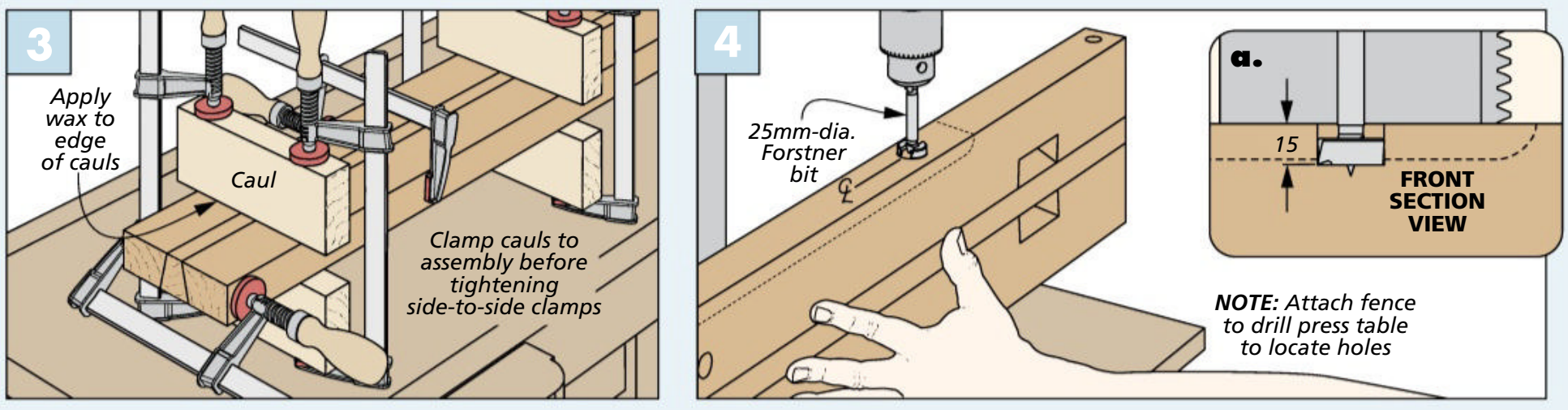
BENCH DOG HOLES. The remaining deck detail is to drill a series of bench dog holes. These allow you to use dogs and hold-downs to secure a workpiece for sawing, drilling and other shaping tasks.

MAKING THE DECK



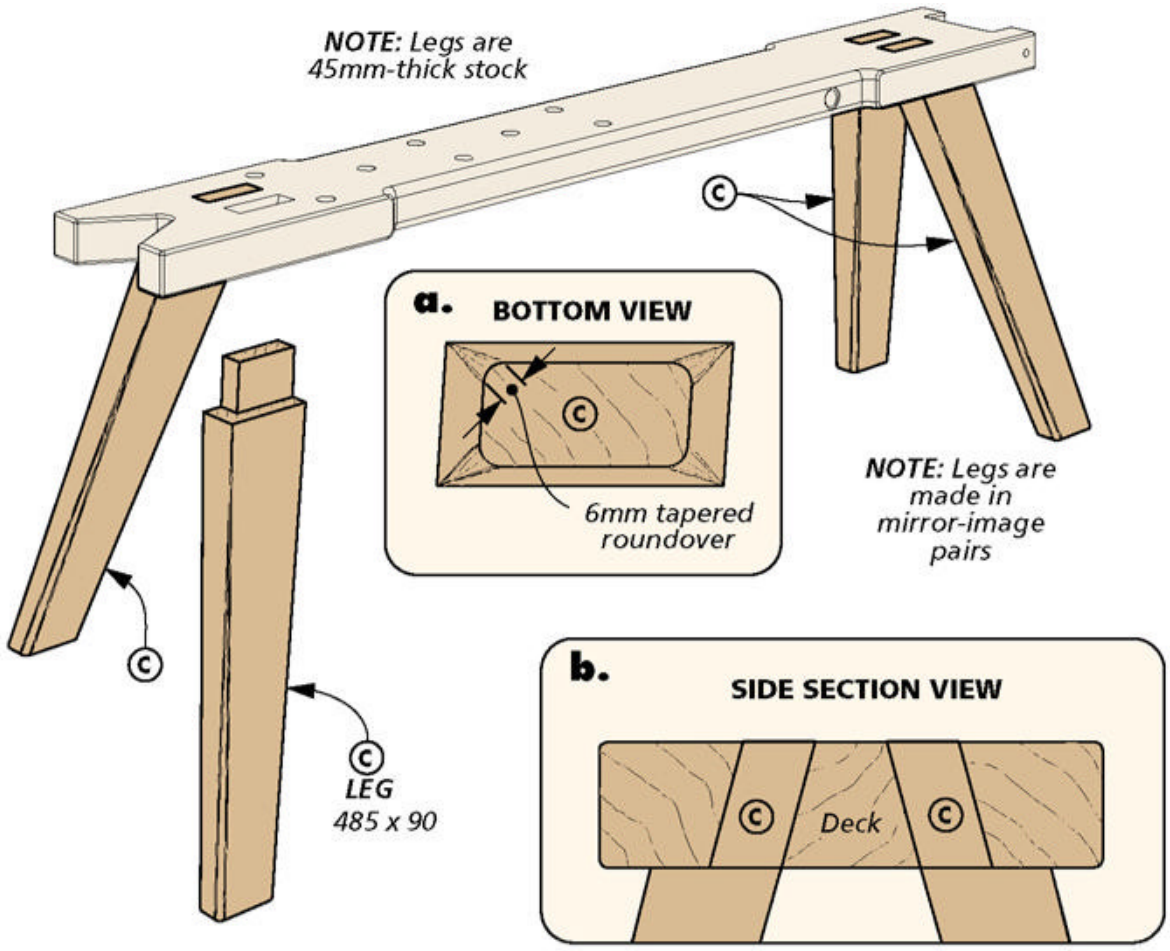
Bevel Ripping. Starting with an extra-wide blank, bevel rip the deck into three narrow strips to help create the raked, splayed mortises.

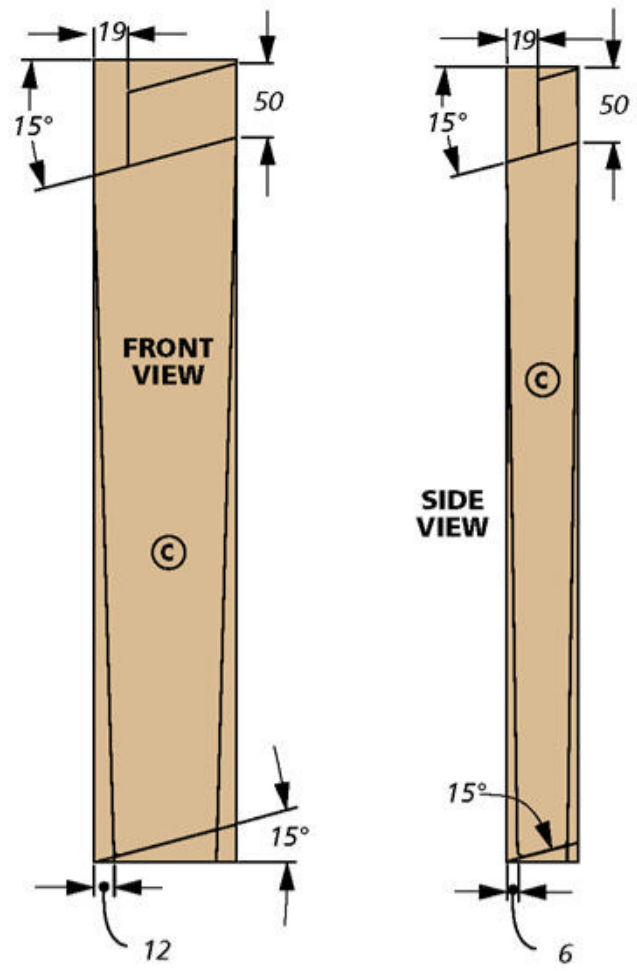
Mortises at the Table Saw. Rotate the mitre gauge to create the splay in the mortise. Be sure to keep the bevelled edge of the strip flat on the saw table (detail 'a'). Make the mortise in several passes.



Glue It Up Flat. The bevelled edges can cause the strip to slip during glue-up. Clamping cauls above and below the joint lines holds the parts in alignment.

Drilling Holes. Start with a Forstner bit to create the counterbore (detail 'a'). Then switch to a brad point bit to drill as deep as you can. Flip the workpiece and repeat the steps on the other edge.





Raked & splayed LEGS

For maximum stability, the legs of the shavehorse angle in two directions called rake and splay. Rake refers to the side to side lean, while splay describes the end-to-end tilt.

The mortises you've already completed in the deck give you a good start. The task at hand is to make the legs to fit into those mortises.

The first step is to cut the legs to final length (the legs are made in mirror-image pairs, so label your parts clearly). This means making a compound angle cut on each end, as shown in the drawings above

There's more shaping to be done, but for now, it's time to tackle the tenons on the top.

THREE-STEP TENONS. When the tenon angles in two directions, forming them follows a different route from a straight tenon.

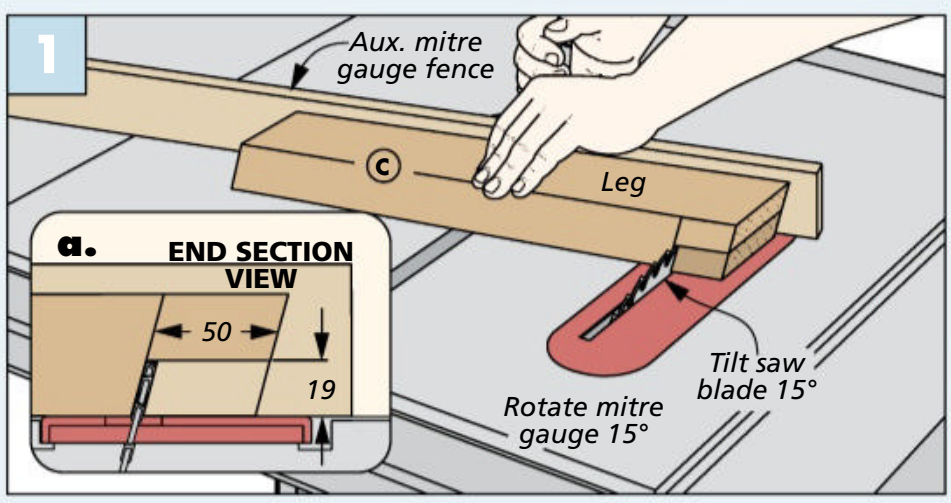
The first step is cutting the wide shoulder. I used a single blade for this step, as shown below in Figure 1. Here, both the blade and the mitre gauge are angled to match the mortise. It's a good idea to locate this cut so that the tenon is a bit longer than the thickness of the deck. This avoids having a sunken joint. (You can trim the tenons flush after assembly.)

For the second step, swap out the single blade for a wide dado blade. In several passes, remove the rest of the waste, working out to the end of the tenon.

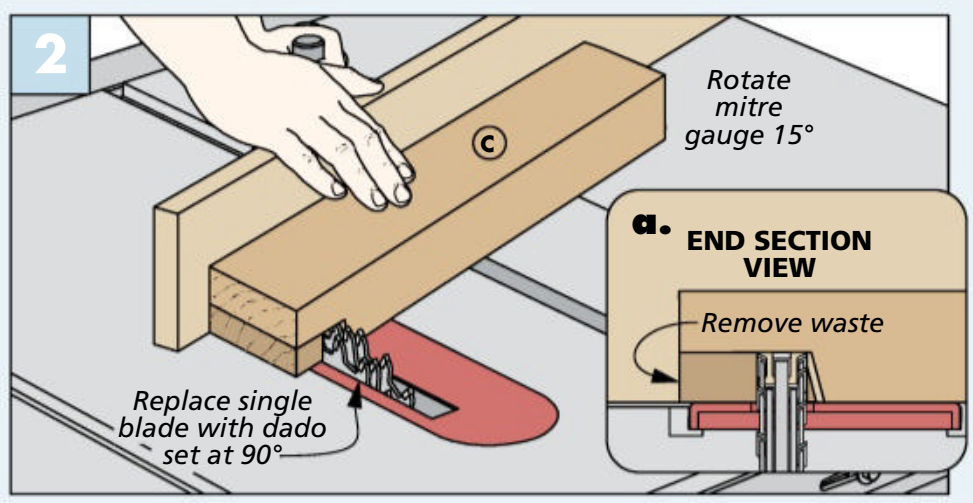
At this point, you should be able to test the fit of the tenon to the mortise by slipping the corner of the tenon into the mortise.

The final step is to cut the tenon to width. You can use the same method as cutting the wide face, but I found that

ANGLED & OFFSET TENONS



Tenon Shoulder. Start with a single blade to define the shoulder on the wide face of the leg. Rotate the mitre gauge and tilt the saw blade.



Tenon Cheek. Square up the blade and switch to a dado stack to remove the remaining waste and form the wide cheek of the tenon.

marking the width and cutting with a hand saw worked just as well.

TAPERED LEGS. When the legs fit the mortises snugly, they're ready for some shaping. The left drawings show a gradual taper along both the width and thickness of the leg. This is done to lighten the look of the leg. There are several ways to approach this detail. The method I used was to form the taper with a hand plane. I started with coarse cuts, then smoothed the faces and edges with lighter passes with a fine blade setting.

Rounding the long edges and end of the leg softens sharp corners and matches the deck. Then glue the legs into the deck.

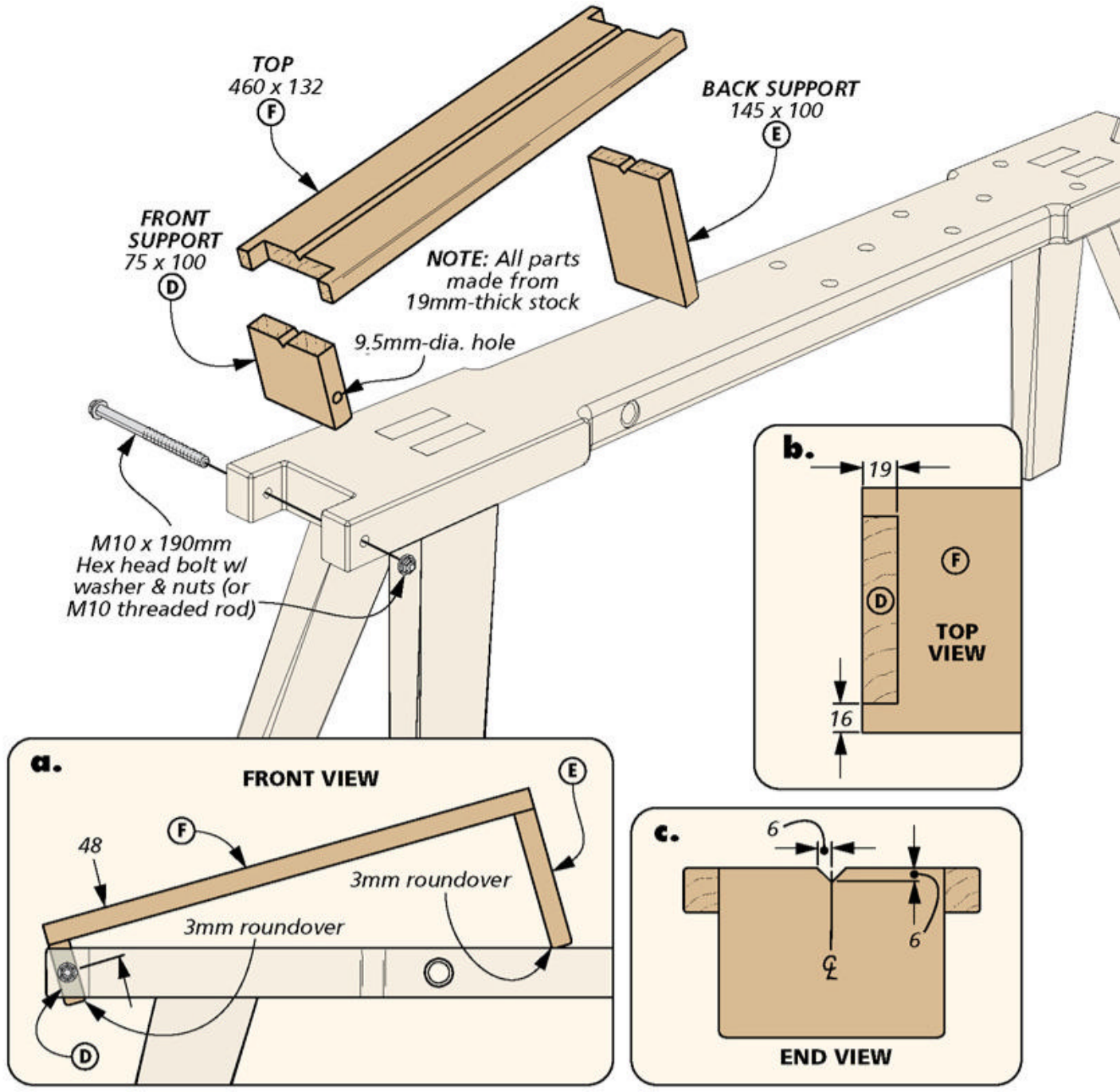
WORKTABLE

Moving up from the legs, the next part of the shavehorse to make is the table, as shown in the right drawing. This assembly creates a worksurface for the workpiece to rest on while it's being shaped.

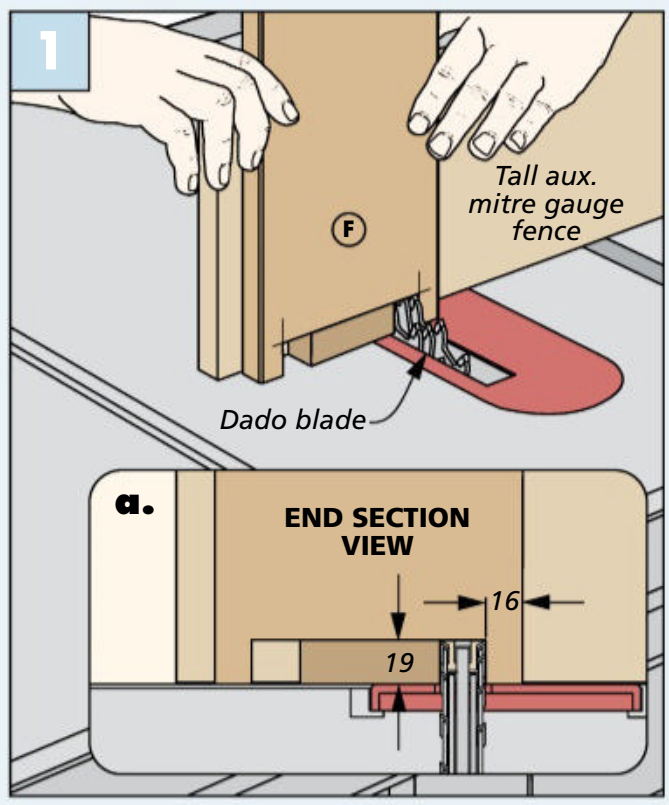
The table consists of three parts: a top and two supports. The supports are different lengths to hold the table at a comfortable working angle. The shorter front support has a hole drilled through it to attach to the deck with a bolt. This forms a pivot so that you can raise the back support up with a block to shape thinner stock. The back support is simply cut to size and the bottom rounded slightly.

NOTCHED. The top is wider than the supports. To join the parts, a notch is formed on the top to accept the supports, similar to a mortise and tenon (detail 'b'). Cut the notches using a dado blade while holding the top on end. The aim here is for a snug fit. Too tight could split the top, so sneak up on the width of the notch. In my book, you should have to press the pieces together firmly with your hands.

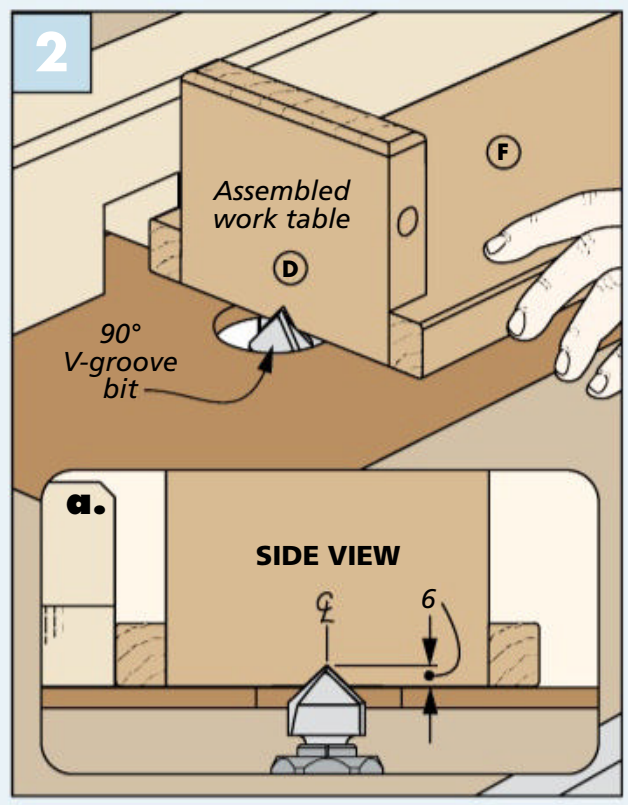
GROOVED. The three parts can be glued together so the upper surface is flat. Once the clamps come off, head to the router table and rout a V-shaped groove down the length of the assembly (detail 'c' and Figure 2). This detail allows you to hold square parts corner to corner and also prevents round parts from shifting in the jaws.



CUT NOTCHES & V-GROOVE



Making a Notch. A tall auxiliary mitre gauge fence provides support for the top while cutting the wide notch.



Routing a V-Groove. Take your time to centre the bit on the width of the table before routing the groove.

An adjustable CLAMP

If you remember your simple machines, there are two here: the lever and the screw. A foot-operated lever presses a jaw against a workpiece resting on the table. The jaw's relative position can be adjusted with a wood screw. There are more pieces here than in the other sections of the construction, but it's still pretty straightforward.

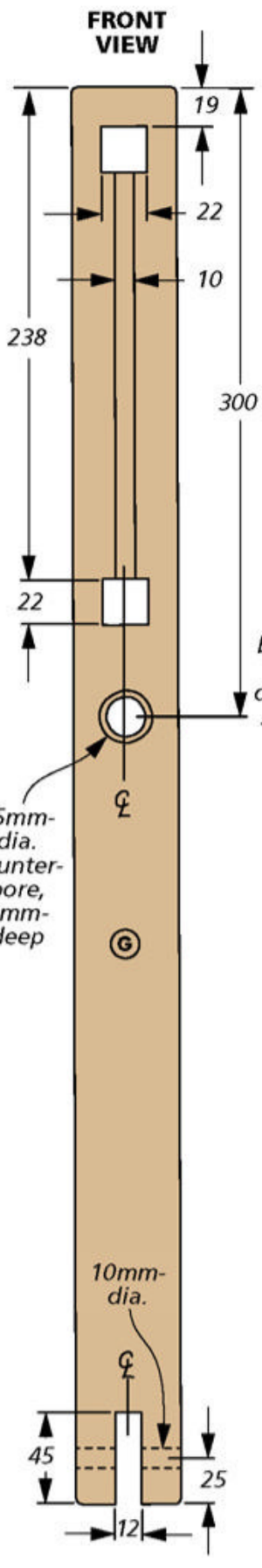
A STRONG FRAME. In essence, you're making a stout frame to support the clamp jaw. It's outlined in the right drawing. A pair of long posts anchor two thick stretchers which together house the sliding jaw assembly.

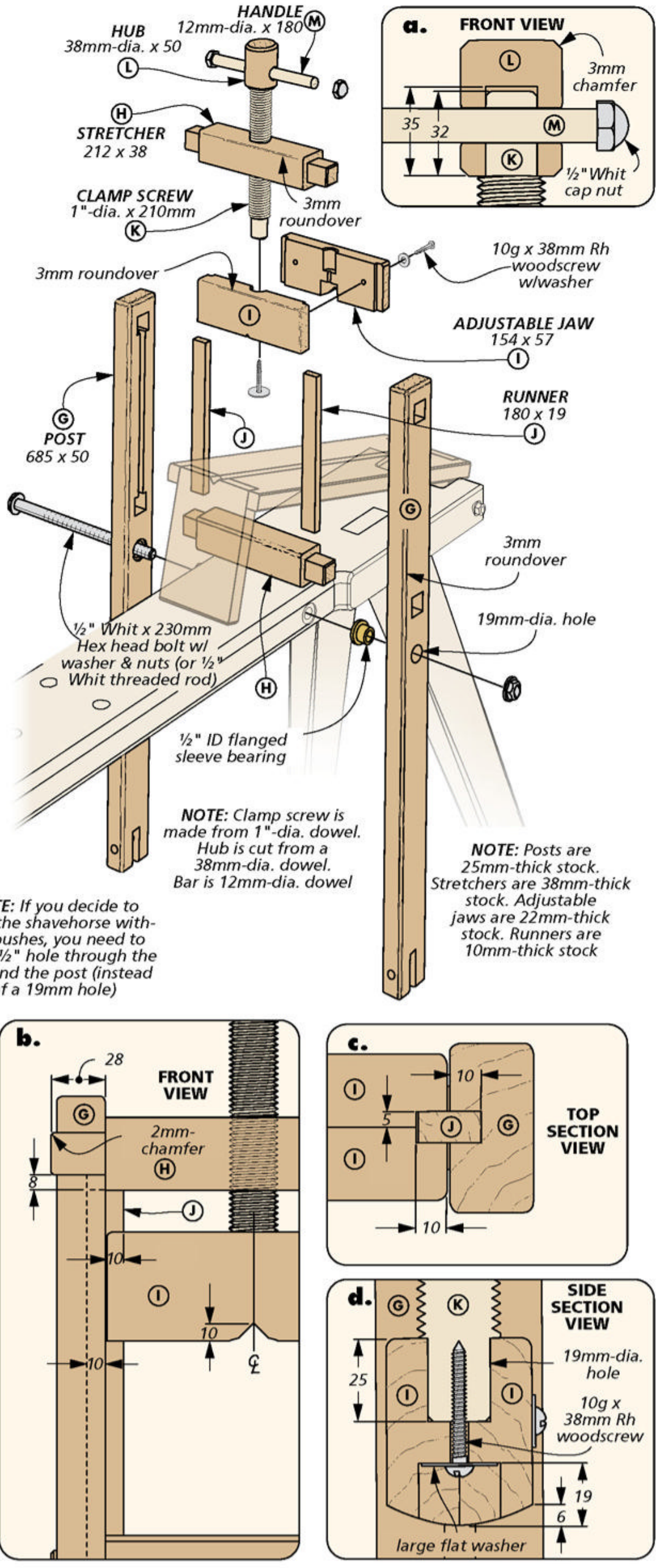
The posts have through mortises in the upper half to hold the stretchers (left drawing and Figure 1 on the next page). A shallow groove runs between the mortises to accept a runner, as shown in details 'b' and 'c.' You can see the way to do this at the router table in Figure 2.

At the bottom, you need to cut a slot to hold the pedal. I found it was best to cut this at the bandsaw. There's also a counterbored hole that holds a flanged sleeve bearing just like the deck. A roundover softens all the edges and completes the post work.

STRETCHERS. The two stretchers have long tenons on the ends sized for a snug fit in the mortises (detail 'b'). The upper stretcher has a threaded hole for the wood clamp screw. A wood threading kit includes a tap and threadbox and is frankly fun to use. The article on page 28 walks you through the process step by step. The stretchers have roundovers routed on the edges and can then be glued to the posts.

ADJUSTABLE JAW. The sliding adjustable jaw is a unique construction. It's made in





two halves and is designed to be assembled in place with screws. Each half has a rebate on each end that together forms a slot to engage with runners installed in the posts, as shown in details 'b' and 'c' on facing page.

The jaw also has holes drilled from each edge to accept the clamp screw from above and a steel mounting screw and large washer from below. To drill these, screw the halves together and drill the holes at the drill press.

The lower edge of the jaw is rounded to make a better clamping surface (detail 'd'). And a centred notch is cut to hold square parts firmly at an angle.

CLAMP SCREW. The clamp screw is made from a wood dowel that's threaded using the threadbox from the kit. (Refer to Sources on page 73.) The dowel has a tenon shaped on each end. I did this at the router table using a straight bit. The dowel is held in a V-block and rotated over the bit to form the tenon.

The clamp screw is capped with a hub cut from a larger dowel (detail 'a' on the previous page). Then drill a hole through the hub and screw to accept a dowel handle. The handle is secured with steel cap nuts twisted onto the ends.

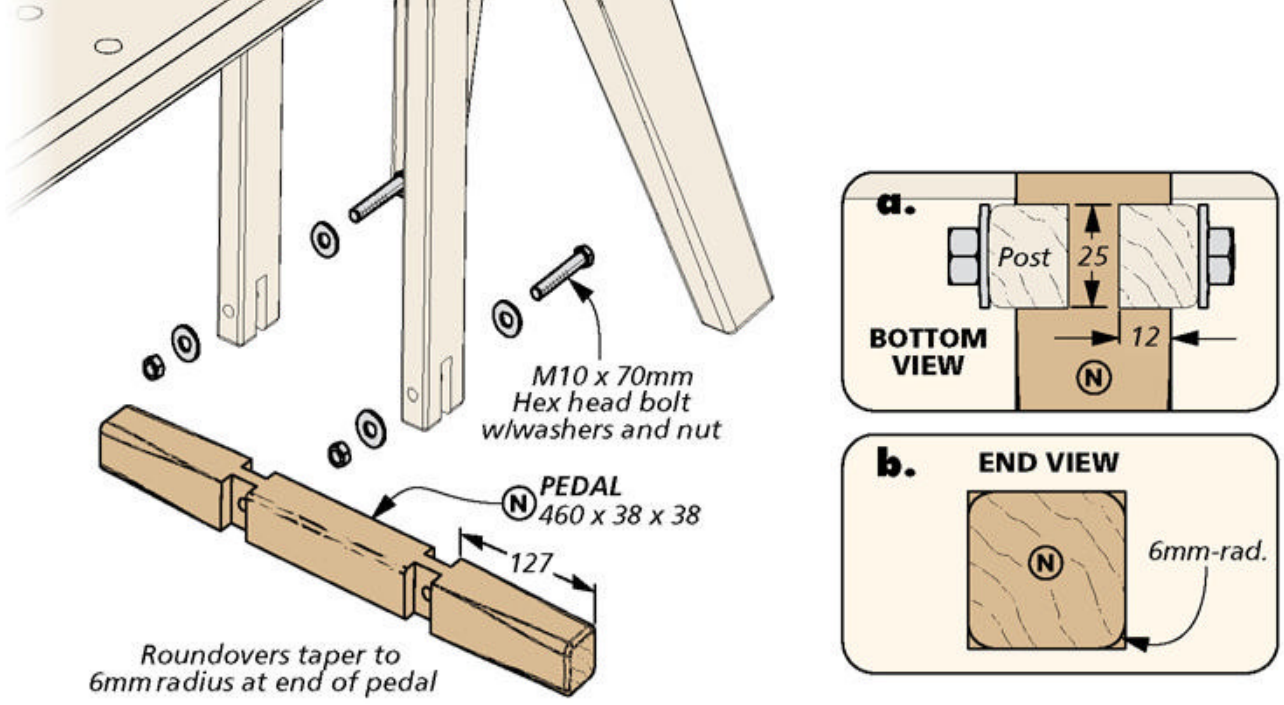
The screw can be threaded into the upper stretcher and screwed into the jaw, as shown in detail 'd' on the previous page. This whole assembly can be installed on the deck using a large hex bolt, washers and a nut.

FOOT PEDAL

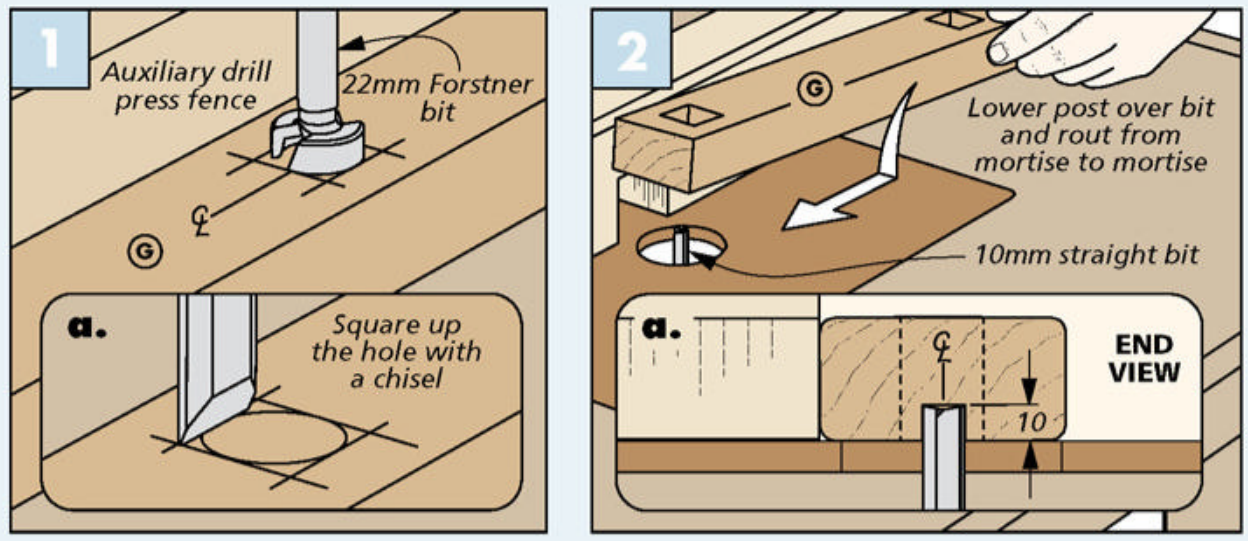
The final part to make is the pedal that attaches to the bottom of the posts. This piece has a pair of trenches cut across opposite faces to slide into the notches in the bottom of the posts (upper right drawing and detail 'a').

Before installing the pedal, shape a tapered roundover on the outer ends. This detail eases the edges of the pedal making it more comfortable to press against and prevents the edges from splintering over time.

The pedal is secured with bolts, washers and nuts (no glue). This way, you can take it apart if necessary. Then you can have a seat, grab a piece of wood and drawknife and before you know it, end up with a chair.



THROUGH MORTISE & GROOVE



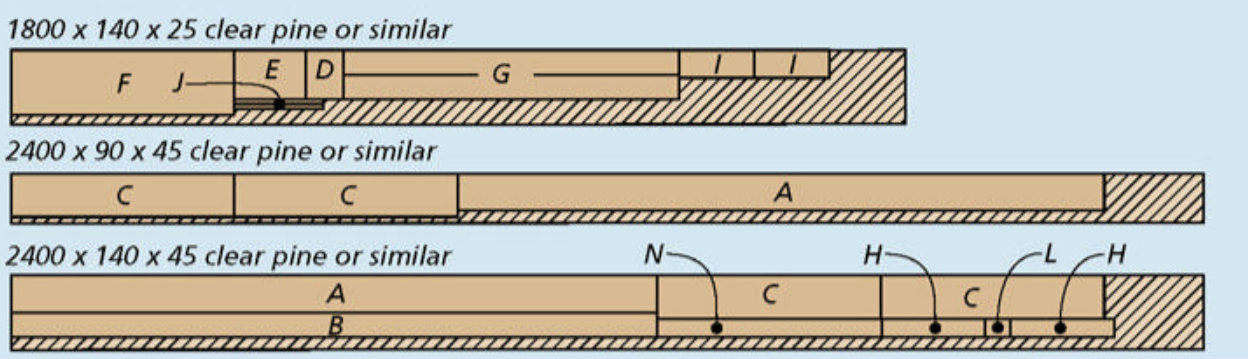
Through Mortise. A Forstner bit and chisel form a one-two punch to create accurate mortises.

Stopped Groove. The router table is my tool of choice for cutting stopped grooves. Cut the groove in two passes.

Materials, Supplies & Cutting Diagram

A	Side Strips (2)	1320 x 75 x 45
B	Centre Strip (1)	1320 x 49 x 45
C	Legs (4)	485 x 90 x 45
D	Front Support (1)	75 x 100 x 19
E	Back Support (1)	145 x 100 x 19
F	Top (1)	460 x 132 x 19
G	Posts (2)	685 x 50 x 25
H	Stretchers (2)	212 x 38 x 38
I	Adjustable Jaws (2)	154 x 57 x 22
J	Runners (2)	180 x 19 x 10
K	Clamp Screw (1)	1"-dia. x 210
L	Hub (1)	38mm-dia. x 50
M	Handle (1)	12mm-dia. x 180
N	Pedal (1)	460 x 38 x 38

- (2) 12.7mmI.D. x 19mmO.D. - ½" Flanged Bearings
- (1) M10 x 190mm Hex bolts & Nuts
- (6) 10mm Washers
- (3) 10g x 38mm Rh Woodscrews
- (2) 10g Washers
- (1) 10g large Washer
- (1) ½" Whit x 230 Threaded Rod & Nuts (or ½" threaded rod)
- (2) ½" Washers
- (2) M10 x 70mm Hex Bolts & Nuts
- (2) ½" Whit Cap Nuts



Arched-stretcher Sofa Table

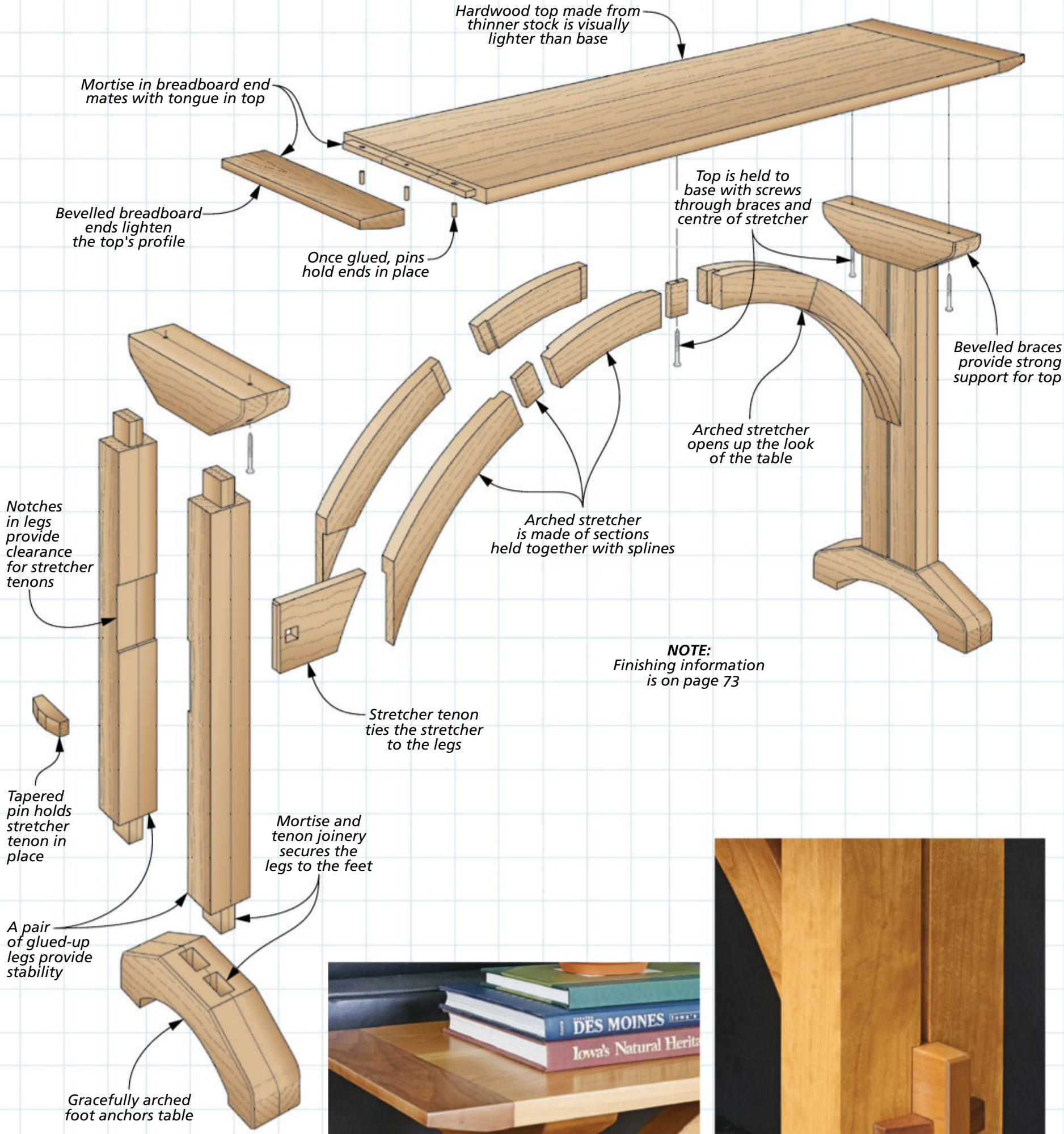
This versatile table is a great addition to any space, casual or formal. As well as the faithful companion to your sofa, it can serve in many ways.

Historically, a sofa table has been a quiet servant that waits dutifully in the wings of the room — behind the sofa. As you see in the photo above, this table is fully capable of fulfilling that duty, but you don't have to stop there. This handsome piece of furniture has more to offer.

The legs and arched stretcher are glued up from thick stock to give the base of the table a strong, massive look. Using thinner 22mm-thick material for the top balances the design. This all means it could serve as a streamlined replacement for a larger buffet in the dining room. Or take up residence in a hallway, entryway or bathroom just as easily. It would also work well tucked under a wall-mounted TV.

All of these versatile options might suggest that you have a complex project that you're preparing to tackle, but that's not the case at all. As shown in the drawing on the next page, you're going to be working with some thick pieces of material, but the well-thought-out design has reduced the joinery to tried-and-true basics. Mortise and tenon joints for the legs and stretcher, plus, throw in a little tongue and groove on the breadboard ends of the top. To fasten the top to the base you'll use five large screws — it can't get much simpler than that.

Construction Overview / OVERALL DIMENSIONS: 1332mm W x 752mm H x 380mm D



NOTE:
Finishing information is on page 73

▲ The bevelled breadboard ends are a nice transition from the sturdy structure of the base.

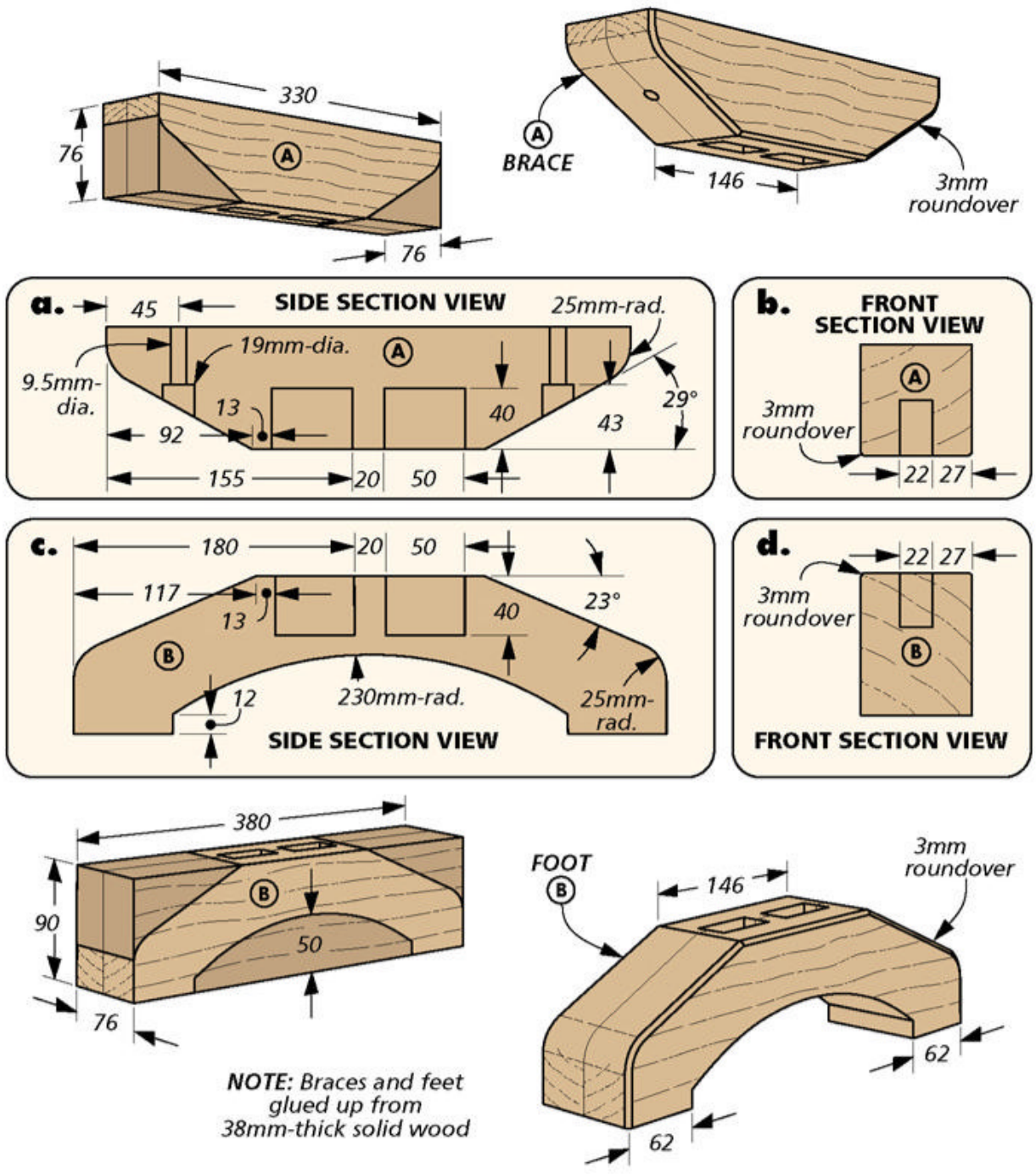
▲ A large tenon and tapered pin secures the arched stretcher to the leg assemblies.

Heavy-duty
LEG ASSEMBLIES

I started the project by focusing on the feet and the braces that support the tabletop. Both of these pieces begin as blanks glued up from 38mm-thick (or 4 x 19mm) stock. For stability, the feet are a little longer than the braces, and if you take a glance at the main drawing, you'll see that they're 14mm wider, as well. This extra width provides room for the arch that I cut in the bottom of the feet. I'll get to that in a little while. First, I tackled making the mortises that tie these pieces to the legs which you'll make shortly.

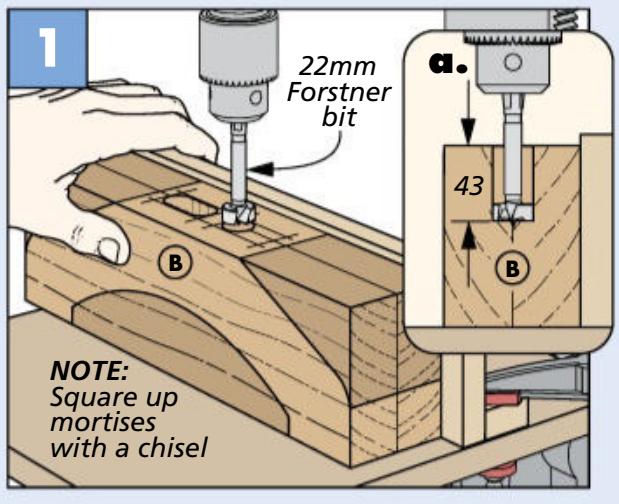
MORTISE WORK. The mortises are centred in the width and length of the blanks for the feet and braces. These are some large mortises, so it's easiest to remove most of the material with a 22mm-dia. Forstner bit (Figure 1). When drilling the holes, drill them slightly deeper than the length of the tenons. This will prevent the tenons from bottoming out in the mortise when installed. After clearing away the chips, complete the mortises by squaring up the walls and corners with a sharp chisel back at the bench.

You can now turn your attention to several other details. There are some mounting holes to drill in the braces, and angled profiles to cut on both pieces, then an arch to cut in the feet.

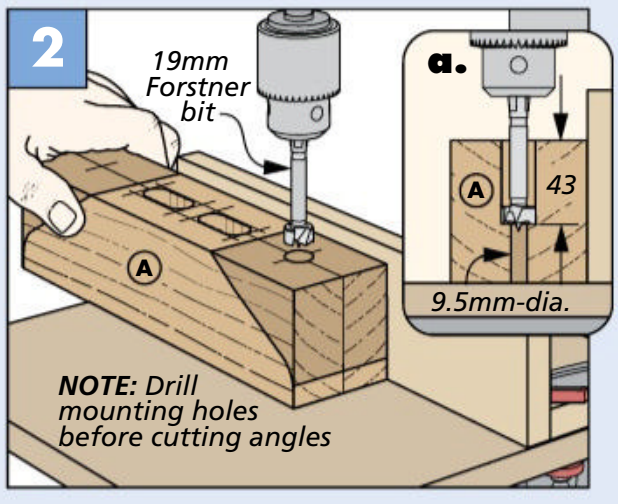


THE BRACES. Before shaping the profile of the brace, you need to drill the mounting holes for attaching the base to the top. These counterbored holes are drilled in both ends of the braces. Figure 2 gives the details needed to complete this. Then you can lay out the angles for the tapered ends. Remove the waste by cutting to the waste side of the line at the bandsaw. Then sand the profile smooth.

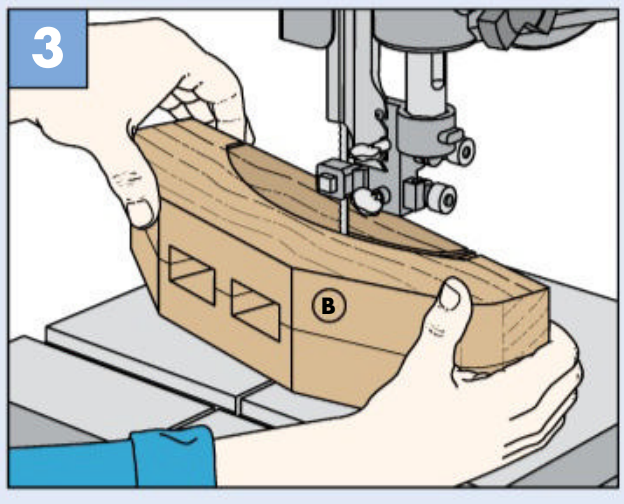
How-To: CUT & SHAPE THE BRACES & FEET



Mortises in Braces and Feet. After drilling holes with a Forstner bit, square up the mortises with a chisel.



Mounting Holes in Braces. After drilling the counterbore to the proper depth, drill the pilot hole.



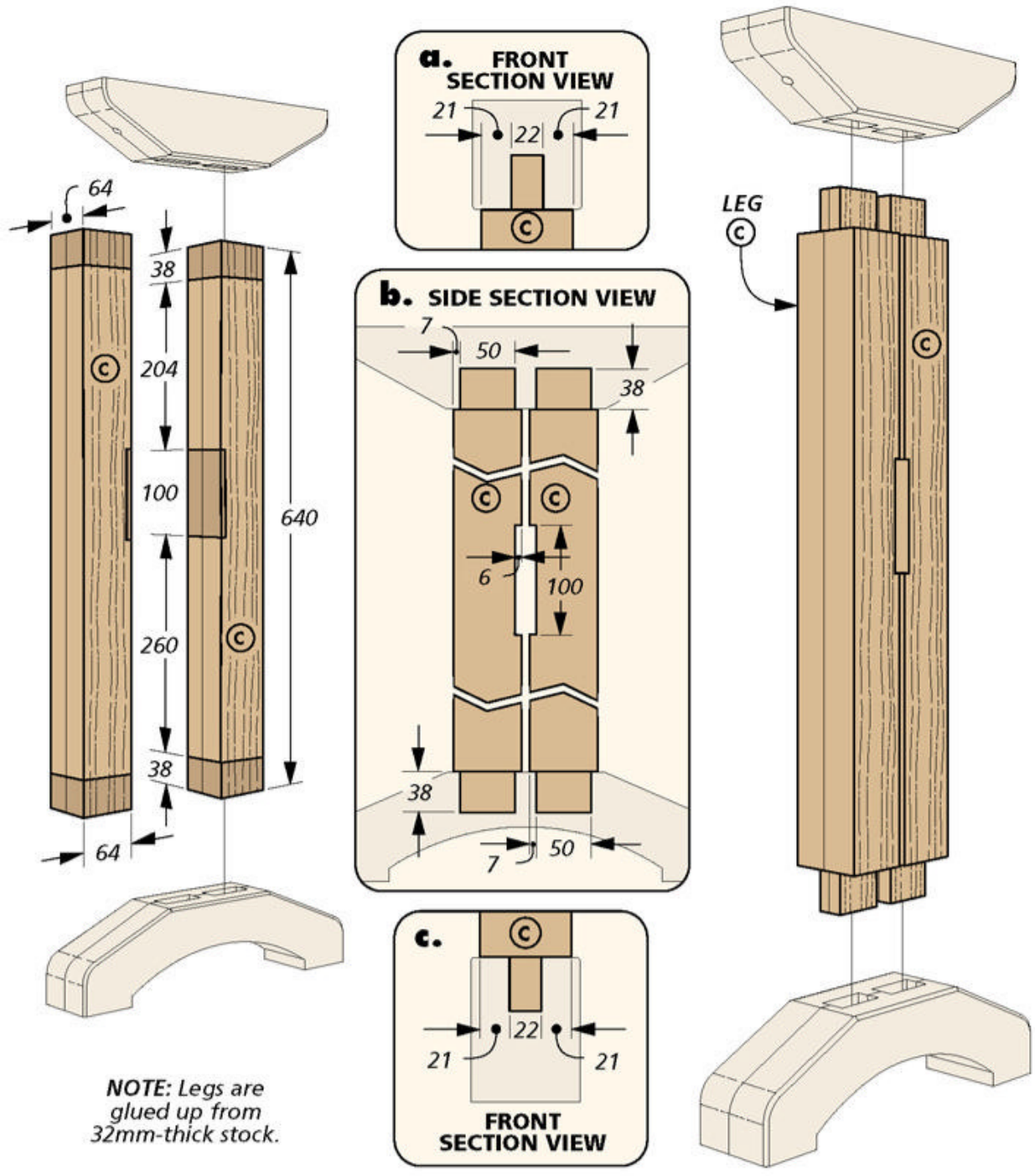
Cut the Arch. The angles on the feet and braces and the arch on the feet are cut at the bandsaw.

THE FEET. As I mentioned earlier, the feet are 14mm wider (taller) than the braces. This gives the feet a little more material to compensate for the arch on the bottom. Figure 3 on the previous page shows you how to cut these out. To finish the feet and the braces, ease the outer edges with a 3mm roundover bit. The legs are the next order of business.

MAKE THE LEGS

Like the feet and braces, the legs are also glued up from two layers of material. But because I wanted the legs to be slightly thinner than the feet, I used 32mm-thick material to glue up the blanks for the legs. As you can see in the main drawing, you'll need to notch the legs to accommodate the tenons of the arch that spans between them. But first, I went to work on the tenons on the ends of the legs.

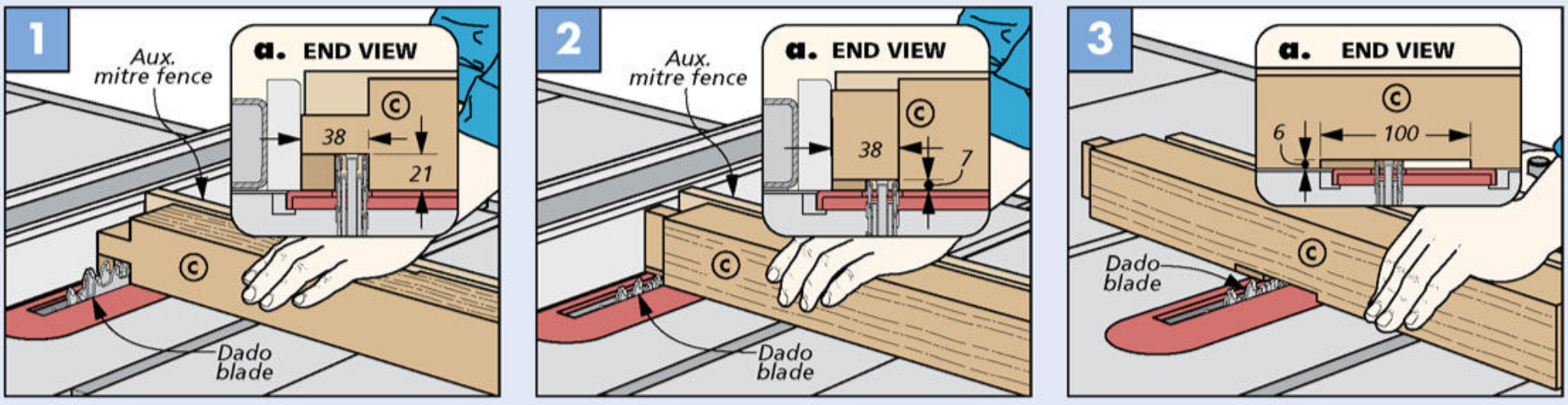
TENON TIME. Start by laying out the tenon locations (and while you're at it, mark the notch location on the inside faces of the legs). Then head over to the table saw and make the cheek cuts (Figure 1). Now you can nibble away the rest of the material to create the tenon shoulders (Figure 2). The depth of the dado set-up for the shoulders of the tenons matches what you need for the notch on the legs (Figure 3). So knock that off your list while you're at the table saw.



Bringing the leg assembly together is up next. With all the parts gathered on the bench, take a moment to consider your clamping strategy.

ASSEMBLE THE LEGS. The large, closely positioned mortises are certainly your ally when it comes to keeping the leg assembly square. But a dry run is in order. When you're comfortable with the fit, apply the glue and clamps in earnest. While those are drying, you can begin work on the stretcher.

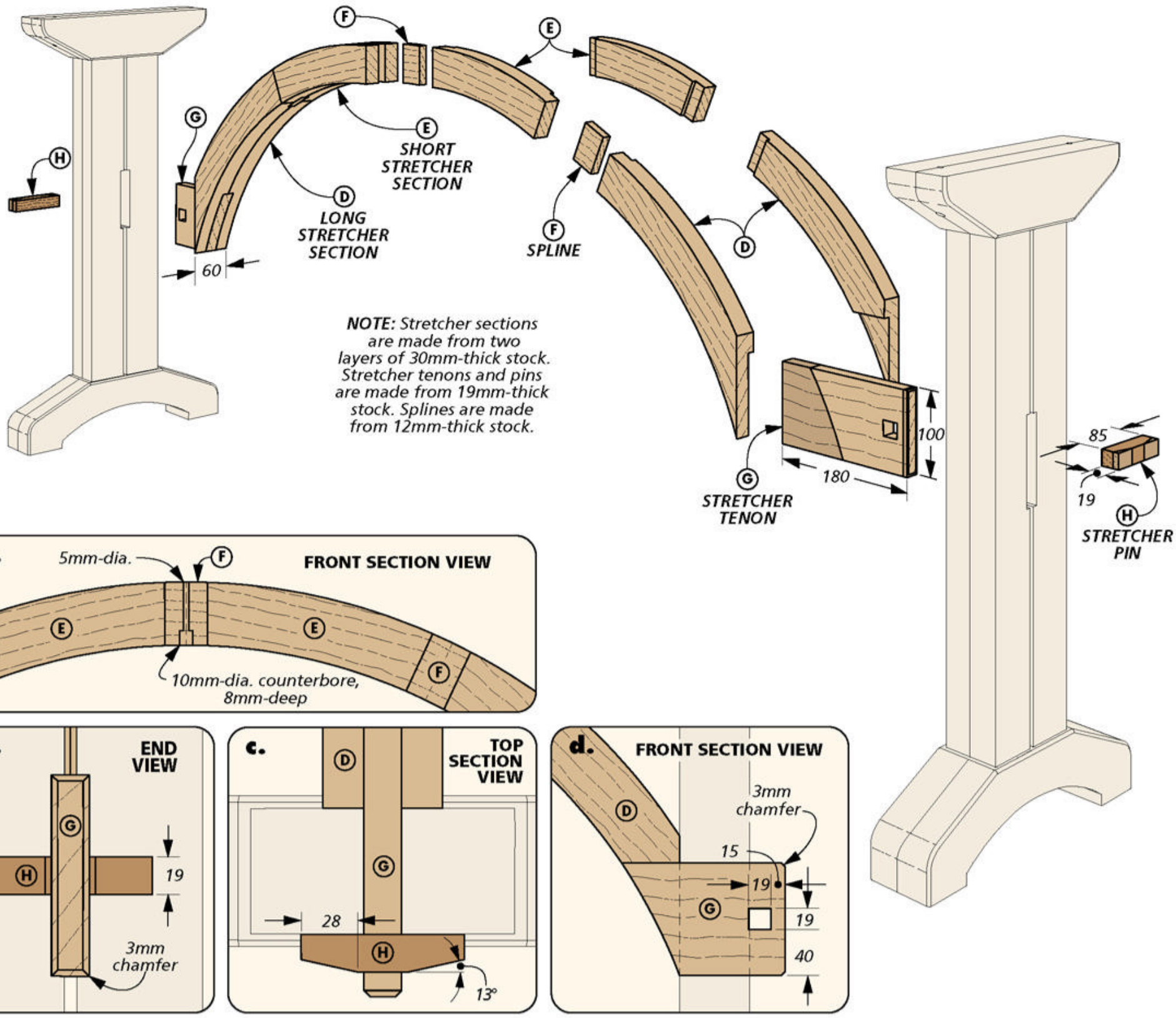
How-To: MAKE TENONS & NOTCHES IN THE LEGS



Cut the Cheeks First. Use an auxiliary mitre fence to prevent any chipout while making the cheek cut.

Shoulders Next. Lower the blade and rotate the leg to make the shoulder cuts on the short side of the tenon.

Notch the Legs. Remove the rip fence and use the mitre gauge to make the notches for the stretcher tenon.



Adding the **ARCHED STRETCHER**

The arched stretcher serves the purpose of tying the legs together and supporting the tabletop. Like all of the previous parts, the stretcher is glued up from two layers of stock. It starts out as four oversized sections that have the ends mitred, as shown in the drawing at the top of the next page. You'll make a set of custom tenons to tie the stretcher to the legs.

MILL THE BLANKS. The mitres on the ends of the four sections that make up the stretcher are all different. The drawing on the top of the next page shows you the details. To tie the sections together, I made a slot in the ends to hold a spline. Figure 1 on the next page shows how to do this. There is still a notch to make in the outer end of the long stretcher sections. This will house a tenon that you'll make later. As Figure 2 shows, this notch is best formed at the bandsaw.

SPLINES. As I mentioned earlier, the stretcher sections are held together with stock splines. For strength and stability, you'll want to orient the grain of the splines so it runs parallel with the grain in the stretcher sections. The drawing above shows what this looks like. The splines won't take long to make. Then you can work on gluing up the stretcher sections.

GLUE UP THE STRETCHER. As you gather all the parts at the workbench to assemble the stretcher, there's a few extra pieces you'll need — clamping cauls. To draw the stretcher together, glue temporary cauls (a dab of glue in the waste area of the blanks) on both sides of the ends of the stretcher blanks. Then you can clamp up the stretcher (on both sides) and set it aside to dry (Figure 3).

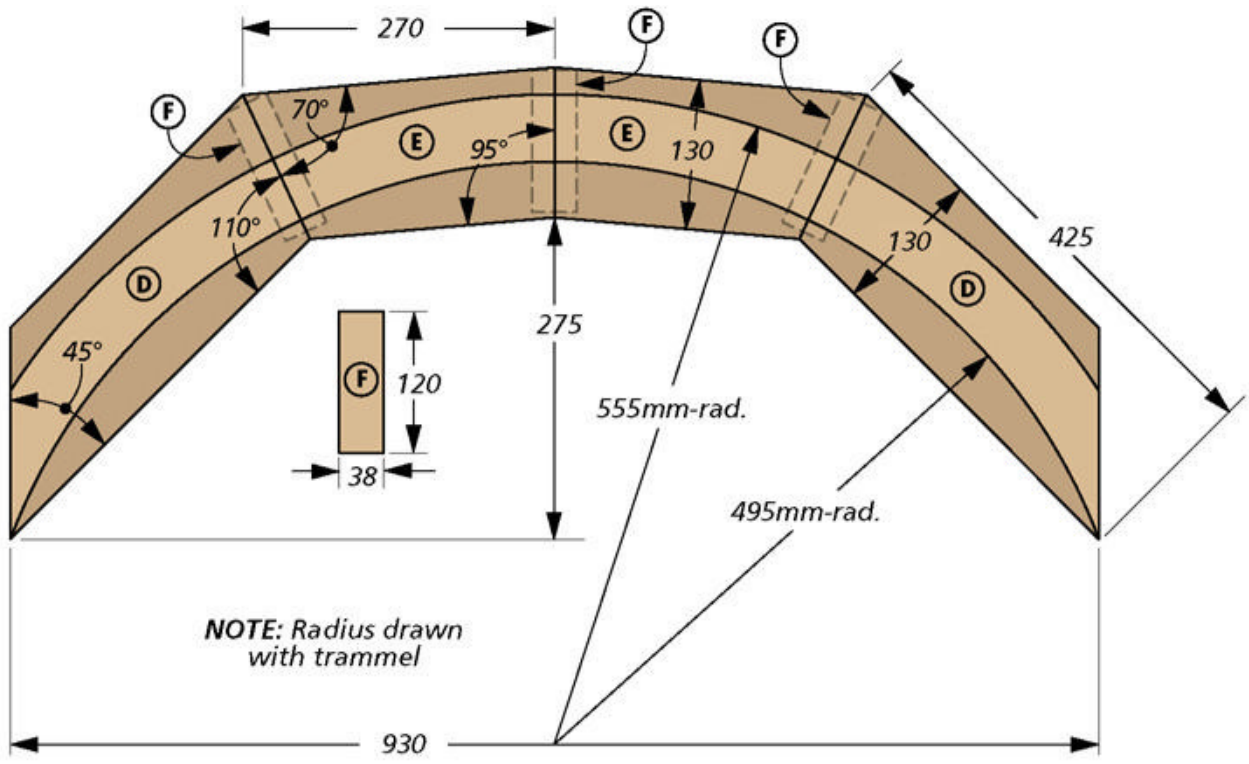
CUT THE CURVE. With the clamps off, gently pry the cauls from the arch. Since you glued them in a waste area, tear-out shouldn't be a problem. The drawing on the top of the next page gives you the measurements for the arch. Figure 4 has the details for shaping it. When you're done sanding the arch

smooth, there's a quick detail to tend to. Figure 5 shows how I drilled the mounting hole in the apex of the arch. Next up is making the stretcher tenons and pins.

STRETCHER TENON & PIN. The stretcher is tied to the legs with through tenons that fit in the openings created by the notches you cut into the legs earlier. They start out as blanks you'll custom fit before gluing them to the stretcher.

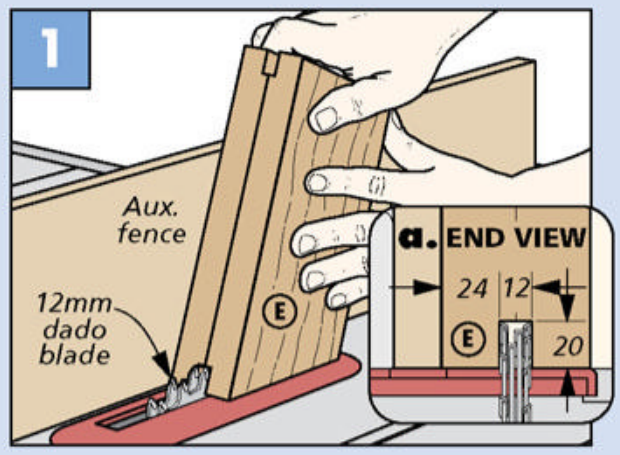
Once the tenons are glued into the stretcher, the stretcher is held in place between the legs with a pair of pins that fit in a square opening in the tenons (detail 'd' previous page). The tenon blank in the main drawing is straightforward enough, but to make the pins I used a sled. The details for it are in Workshop Notebook on page 58.

SHAPE THE TENON. The goal for shaping the tenon is to cut the end of the tenon to match the shape of the arch. With the legs spaced the proper distance apart, slide the stretcher tenon blanks, and its pin, in position through the notches in the legs. Now you're ready to drop the stretcher assembly in place over the tenons and trace the profile (Figure 6). Make this cut at the bandsaw to the waste side of your mark.

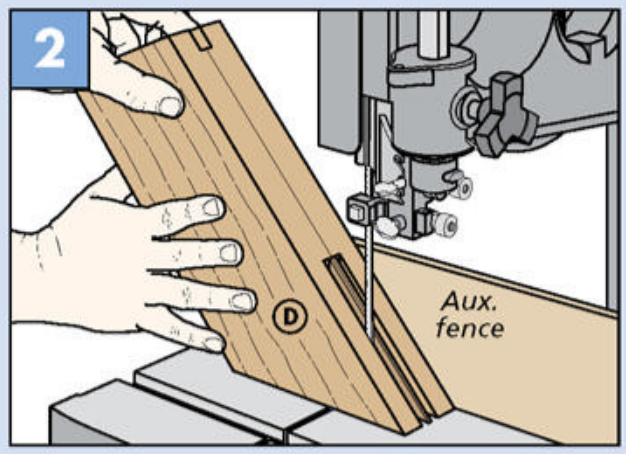


GLUE THE TENON TO THE STRETCHER. Before you put the assembly back together, glue and clamp the tenons to the arch. When the joint is dry, sand the curved end of the tenon flush to the arch.

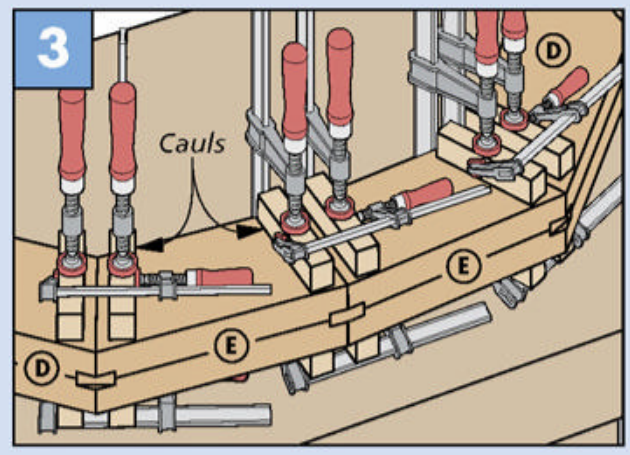
How-To: SIZE, SHAPE & ASSEMBLE ARCH PARTS



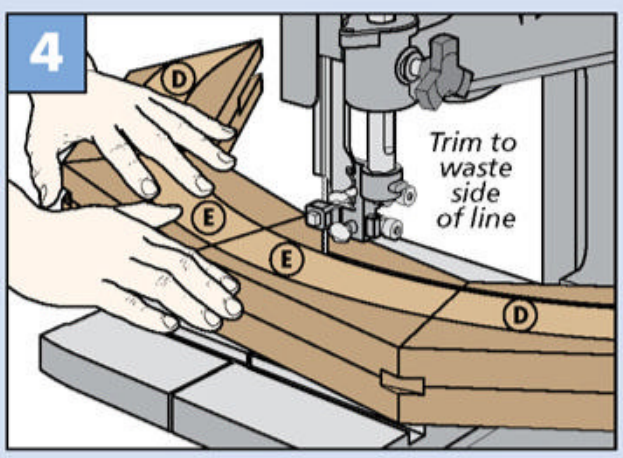
Cut Slots. Use a tall auxiliary fence on the table saw to support the stretcher sections as you cut the spline slots.



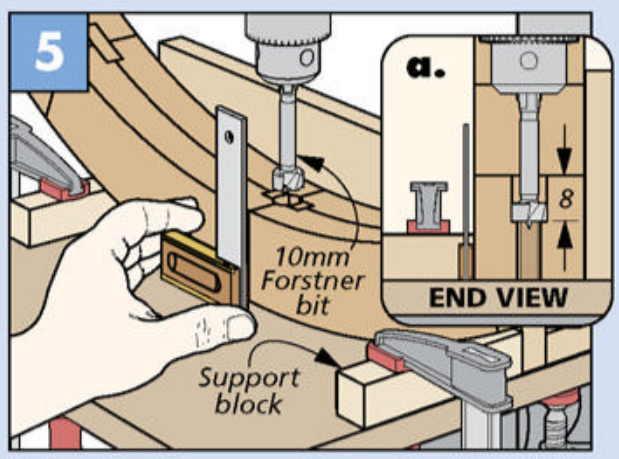
Notch for Tenon. Cut the shoulders of the notch, then nibble away the rest. Clean up the notch with a chisel.



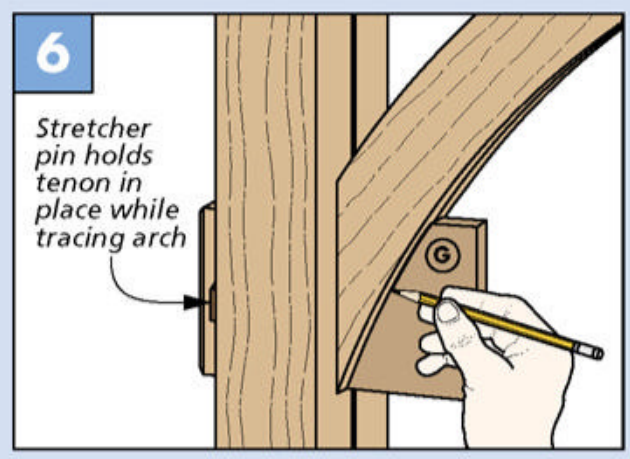
Clamp Sections. The clamping cauls make it easy to glue the stretcher sections together without gaps.



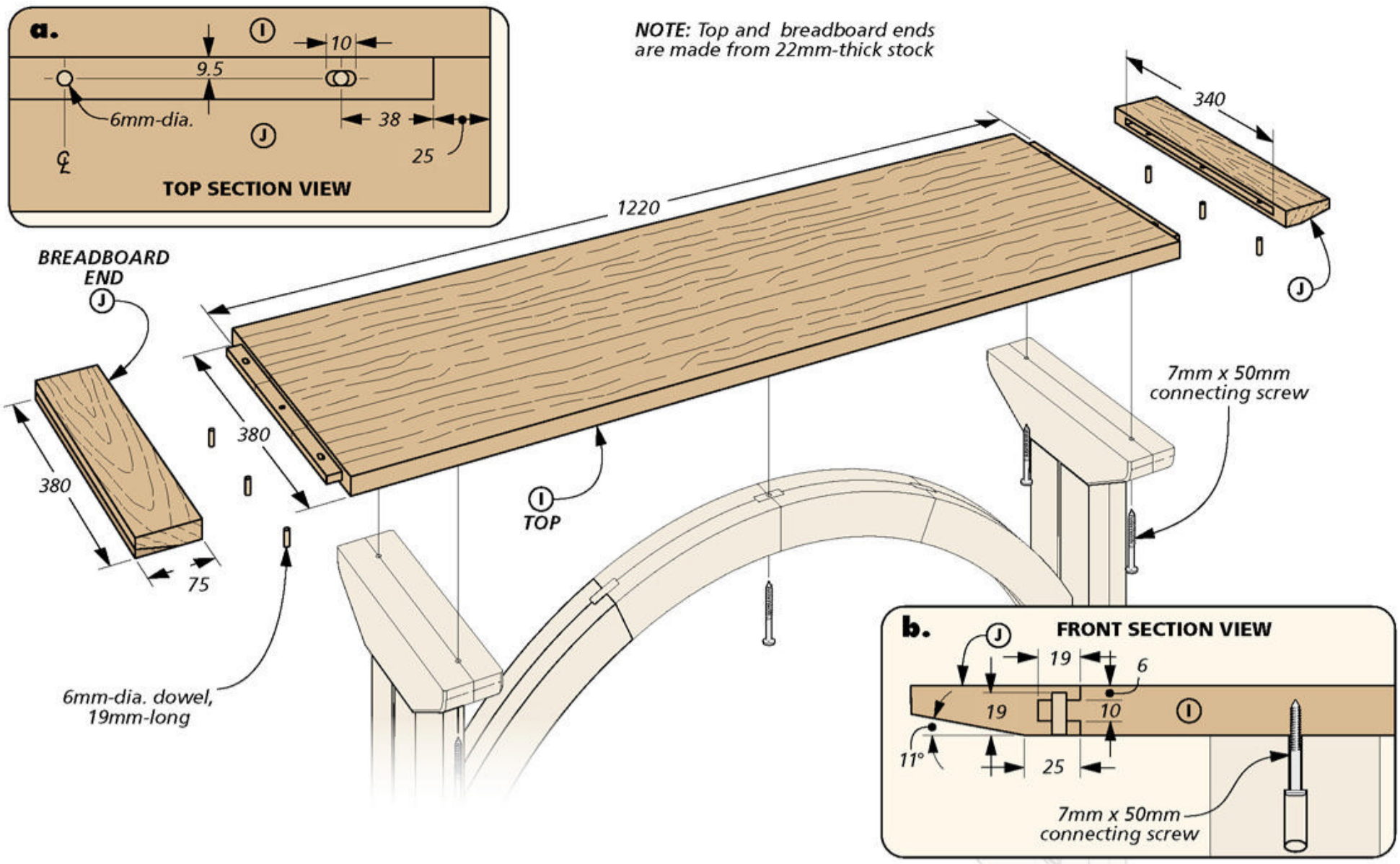
Cut Out Arch. Remove the waste parts of the stretcher at the bandsaw, then sand smooth to the layout line.



Drill Mounting Hole. Clamp support blocks to the drill press table, then drill the counterbore and pilot holes.



Trace Curve. Dry assemble the base to trace the profile of the stretcher onto the tenon, then cut it to shape.



Completing the TABLE

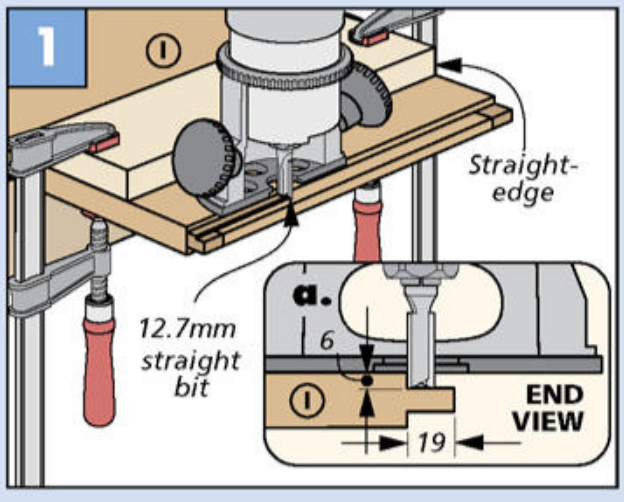
With the leg assemblies complete and the stretcher installed, all that's left to do is make the top. To lighten the look of the top, I made it from 22mm-thick stock. The bevelled breadboard ends also add to this effect and give the top a formal flair. Gluing up an oversized blank for the body of the top was the first order of business.

SIZING THE TOP. The long and narrow top presents a bit of a challenge when it comes to trimming it to length. So instead of trying to use the table saw, I did the work at the bench.

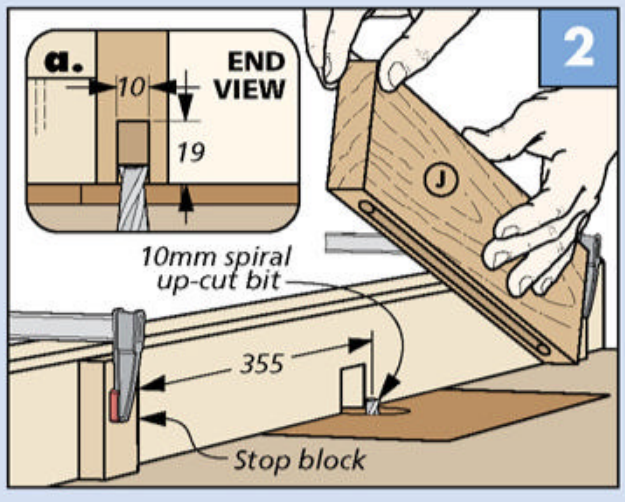
The easiest way to cut the top to its final length is with a circular saw. Since both ends of the top are going to have a tongue milled on them, any minor chipping that happens isn't a concern. Just make sure your cut is square. When you've finished that, you can move on to making the tongue.

Again, due to the length of the top, it's best to use a handheld router and a straightedge to make the tongues. Figure 1 below gives you the information needed to pull this off. Once the router is put away, you can

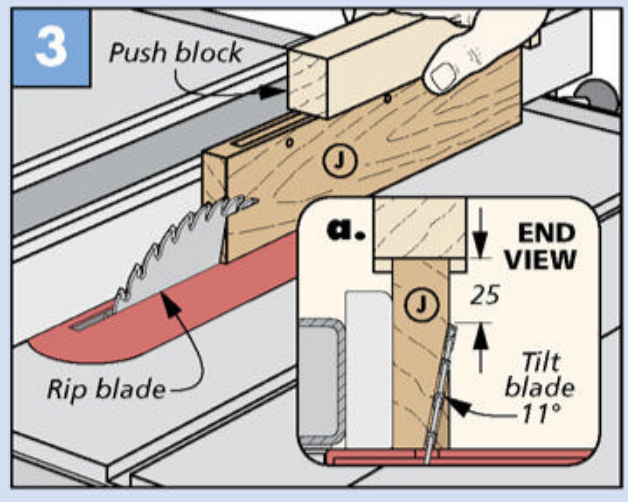
How-To: CREATE THE TABLE TOP & BREADBOARD ENDS



Tongue. Use a router and straightedge to create the tongue, then cut the shoulders with a handsaw.



Rout the Mortise in Ends. Create the mortise in several passes by running the workpiece between the stop blocks.



Bevel the Ends. To prevent burning, use a sharp blade and steady feed rate to cut the bevel on the workpiece.

create the shoulders on the tongue. I did this with a handsaw and chisel. That's all the prep needed for the top. You can turn your attention to the breadboard ends now.

BREADBOARD ENDS. After I sized the pieces for the breadboard ends, I drilled the holes on the undersides of the work-pieces for the dowel pins that will hold them in place. As detail 'b' shows, these are not through holes, so I was mindful of how deep I was drilling them. Next is the slot that fits over the tongue in the top. As you can see in Figure 2 on the previous page, the mortise is created at the router table employing some stop blocks and a spiral up-cut bit.

THE BEVEL. There's one more task to perform on the breadboard ends, and that's cutting the wide bevel on the underside of the piece. Figure 3 on the previous page shows this. Tilting the blade on your table saw 11° is what's needed here. Go at a steady pace without stopping to avoid burning the wood. A little time with a sanding block will remove any blade marks.

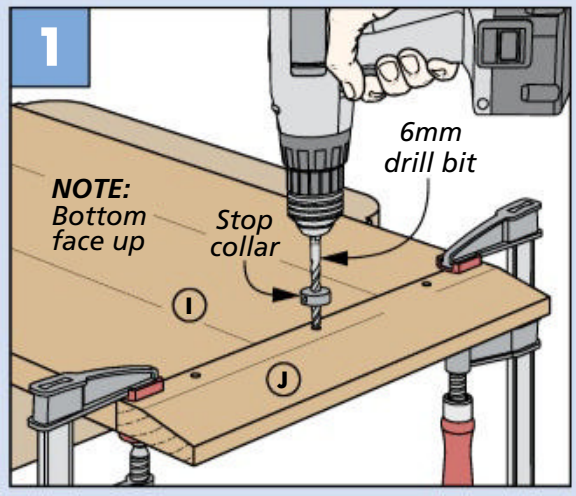
There's a bit more work to do before attaching the ends. First, you need to drill the holes in the tongues for the dowels in the breadboard ends. Figure 1 above shows this. With the holes drilled, remove the ends for a moment and widen the outer holes like you see in Figure 2 above. This is needed to account for seasonal wood movement.

When you glue the breadboard ends on the top you'll make allowance for seasonal movement, as well. To do this, apply glue to just the centre third of the tongue. And just enough glue on the dowels to hold the end in place. This lets the top move when it needs to.

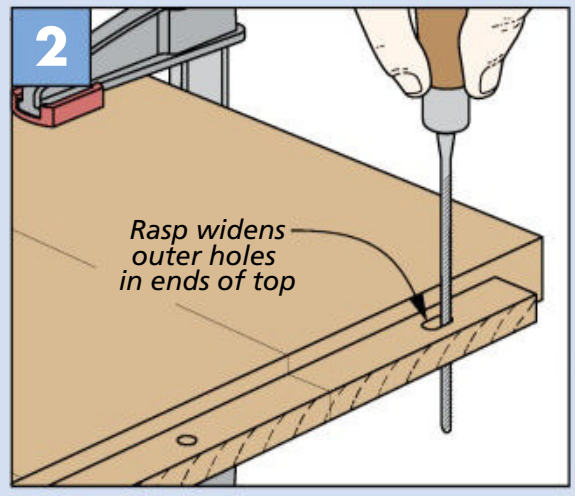
FINISHING TIPS. To add a little contrast, I decided to stain the breadboard ends and the stretcher pins slightly darker than the rest of the table. I started out with a coat of sanding sealer over the entire table. Then I stained the breadboard ends (after masking them off) and the stretcher pins with a dark stain. When they were dry, I stained the rest of the table with a lighter stain, followed by two coats of lacquer.

ASSEMBLY. To bring the table together, you need to lay the top face down. Then centre the upside-down base assembly on it. Now screw the base to the top. However you decide to use the table, there will be no regrets for the time you invested in building this beauty. W

How-To: INSTALL THE BREADBOARD ENDS



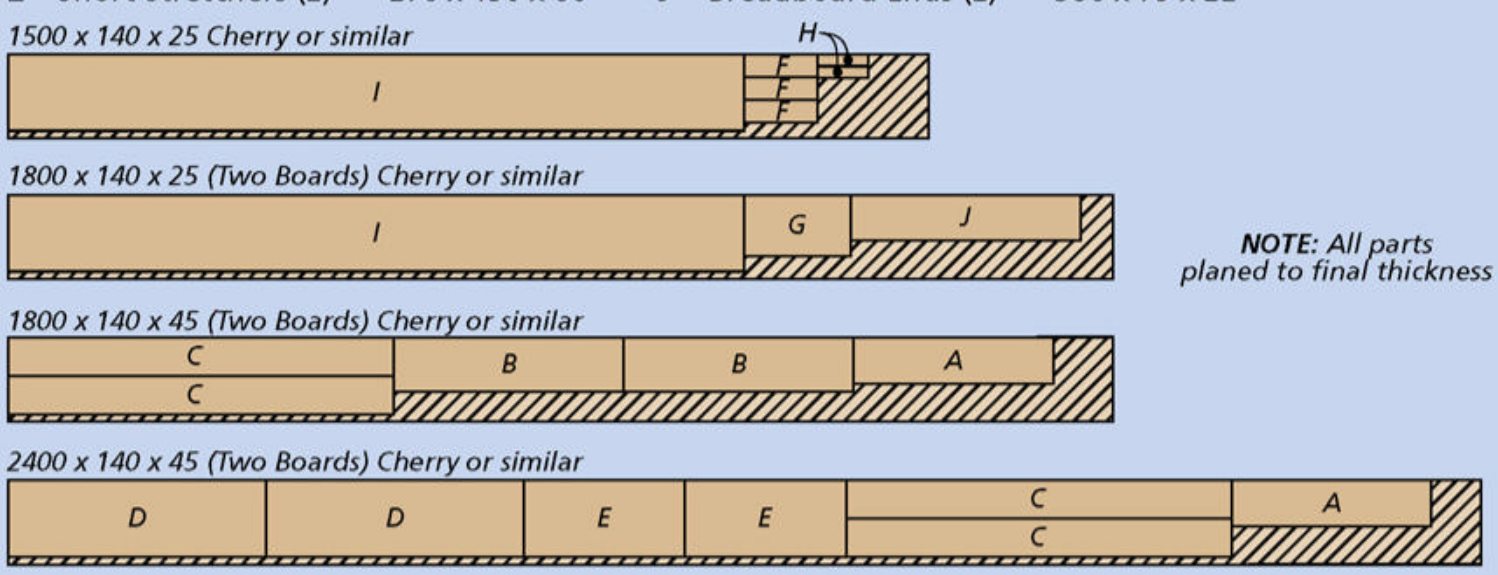
Drill Holes in Tongue. Use the breadboard ends to locate the holes in the tongue on the end of the top.



Widen Outer Holes. To allow for seasonal wood movement, widen the outer holes with a rasp.

Materials, Supplies & Cutting Diagram

A	Brace (2)	330 x 76 x 76	**F**	Splines (3)	120 x 38 x 12	• 6mm-dia. x 300mm dowel
B	Feet (2)	380 x 90 x 76	**G**	Stretcher Tenons (2)	180 x 100 x 19	• (5) 7mm x 50mm Connecting Screws
C	Legs (4)	640 x 64 x 64	**H**	Stretcher Pins (2)	85 x 19 x 19	
D	Long Stretchers (2)	425 x 130 x 60	**I**	Top (1)	1220 x 380 x 22	
E	Short Stretchers (2)	270 x 130 x 60	**J**	Breadboard Ends (2)	380 x 75 x 22	



Workshop Notebook & Short Cuts

TAPERING SMALL PIECES

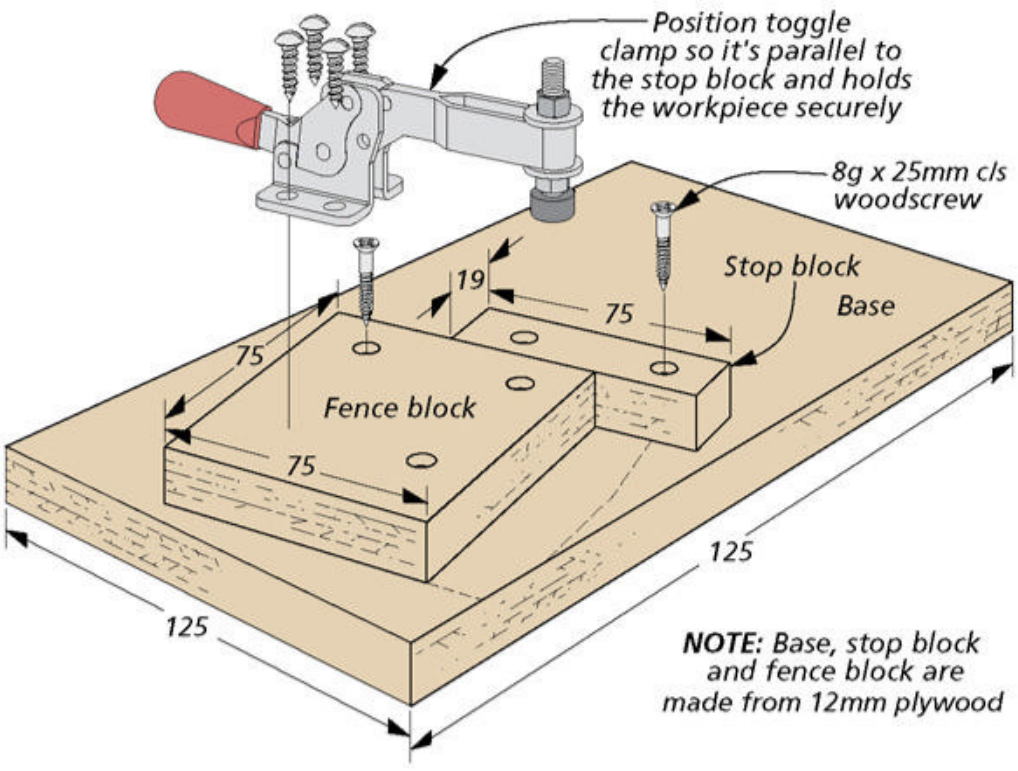
The stretcher pin that holds the stretcher in place between the legs of the sofa table (page 50) is a small piece of solid wood. It's so small that I didn't feel safe holding the piece by hand to make the taper cuts at the table saw.

I found an easy way to remove any risk while cutting the tapers. The sled you see below lets you safely and accurately cut the tapers on the pin.

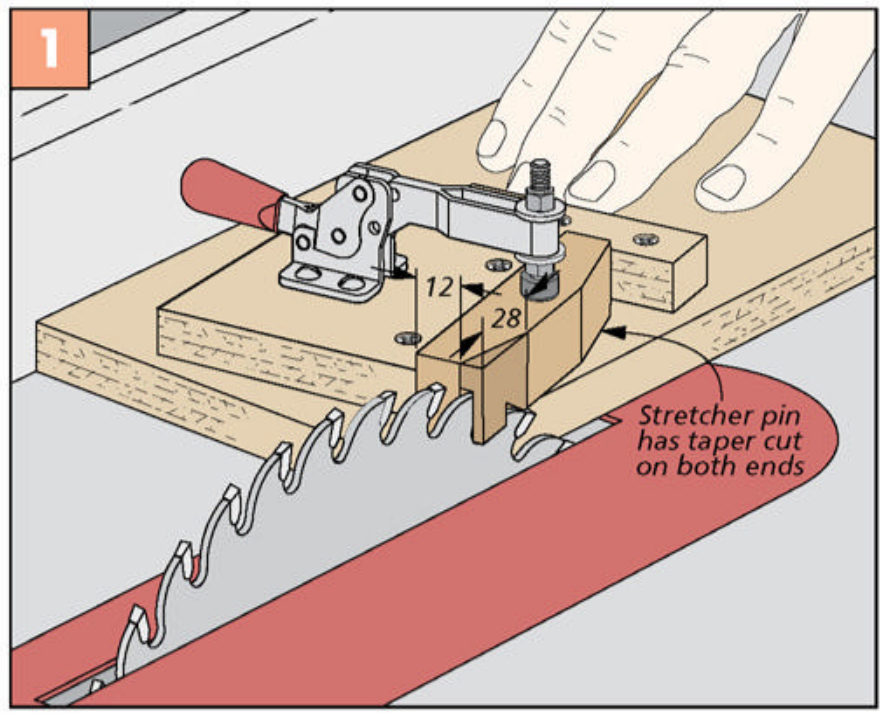
THE SLED. Three pieces of plywood, a handful of screws and a toggle clamp are all that's needed to make the sled.

The stop block and the fence block are positioned on the sled using the stretcher pin for positioning. To do this, cut the stretcher pin to its final length, and draw the taper location on one end. Figure 1 shows the size of the taper. Now position the pin on the base so the taper aligns with the edge of the base. Then you can bring in the blocks and fasten them in place. Follow this by installing the toggle clamp.

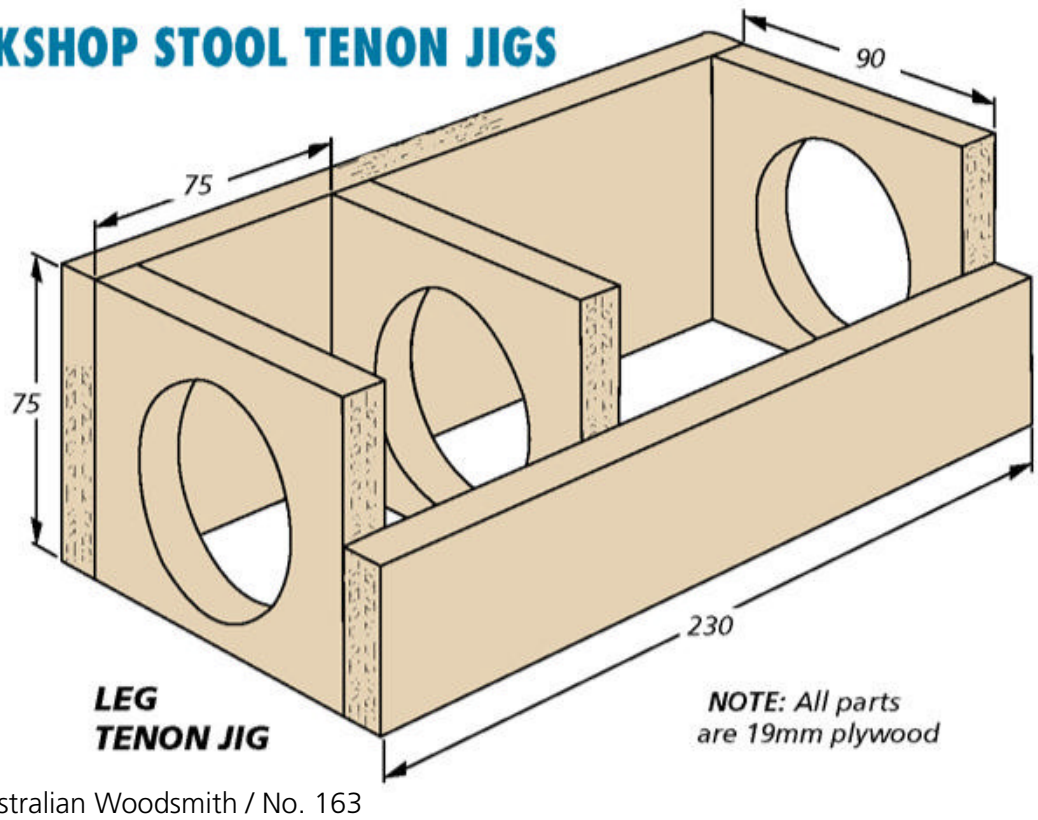
SIMPLE OPERATION. Using the sled is a straightforward process. Simply set the pin against the blocks and lock it in place with the toggle clamp. After one end is cut, flip the pin end for end in the sled and repeat the cut.



NOTE: Base, stop block and fence block are made from 12mm plywood

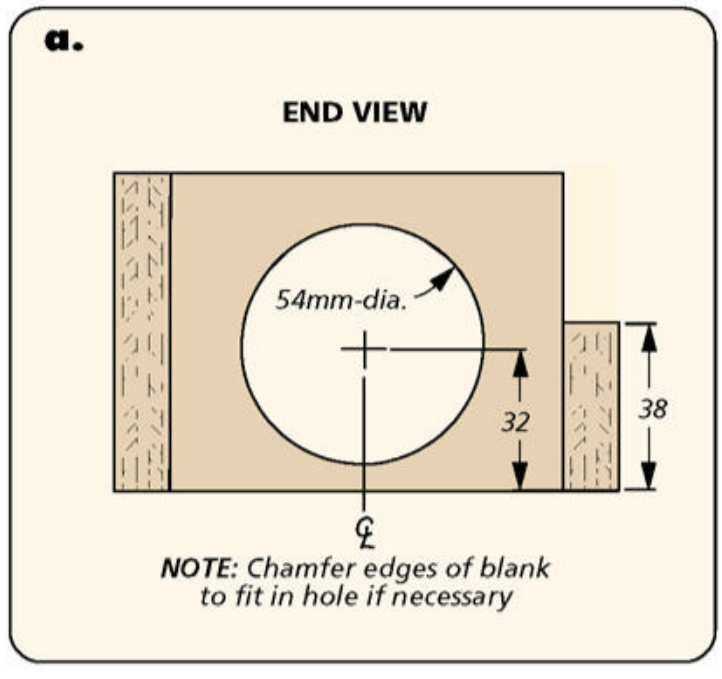


WORKSHOP STOOL TENON JIGS



LEG TENON JIG

NOTE: All parts are 19mm plywood

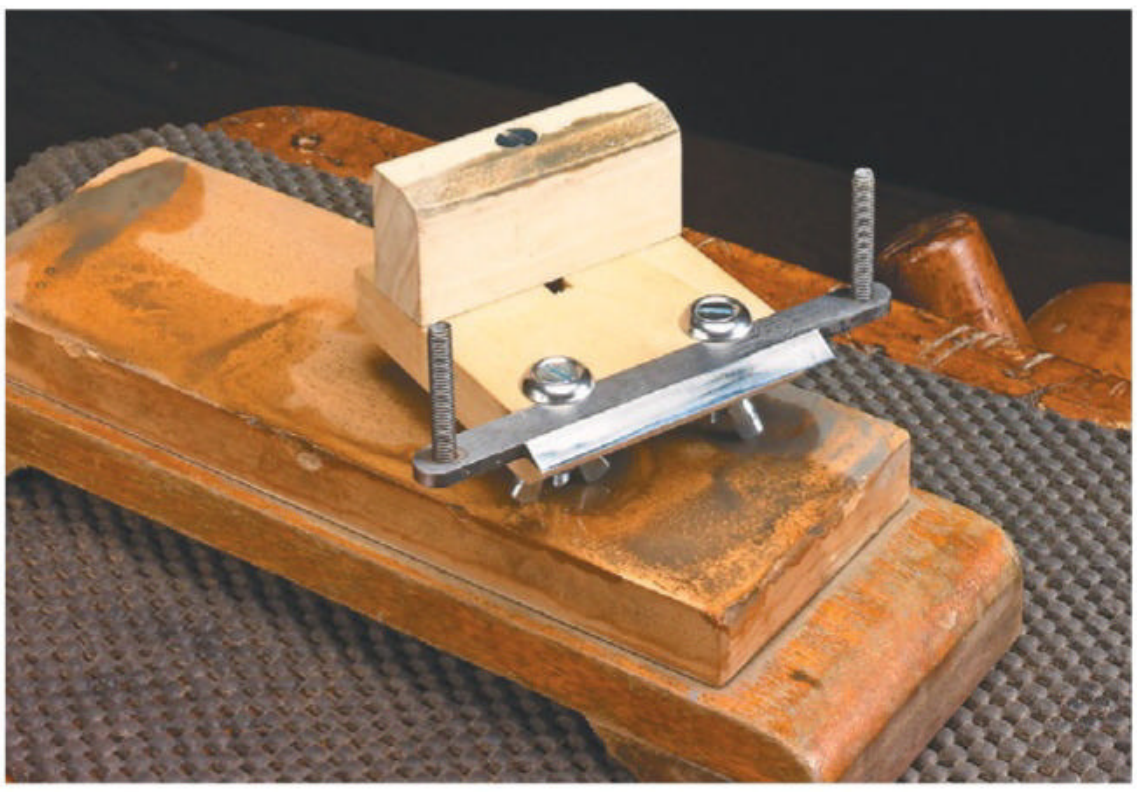


NOTE: Chamfer edges of blank to fit in hole if necessary

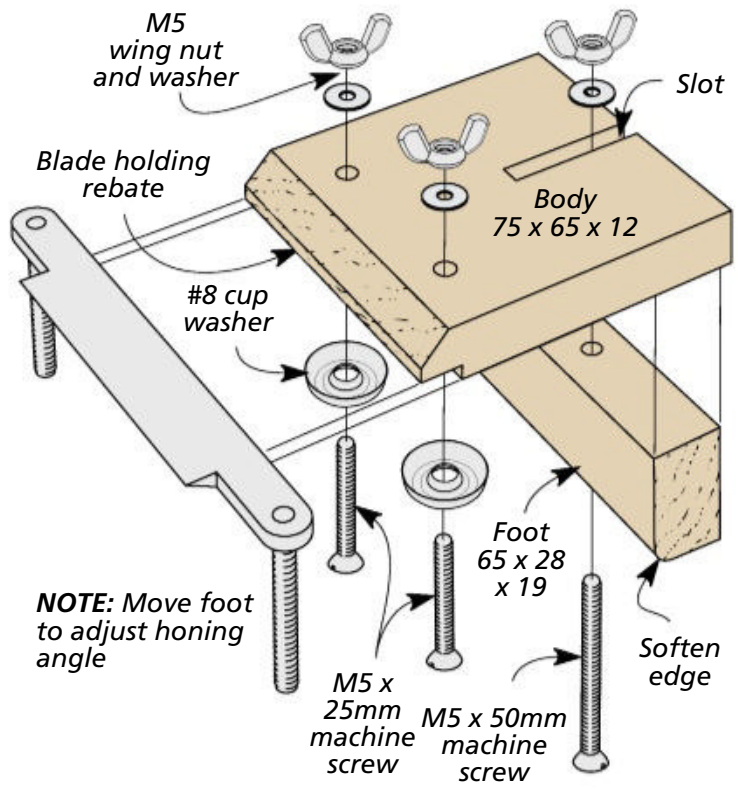
SPOKESHAVE SHARPENING JIG

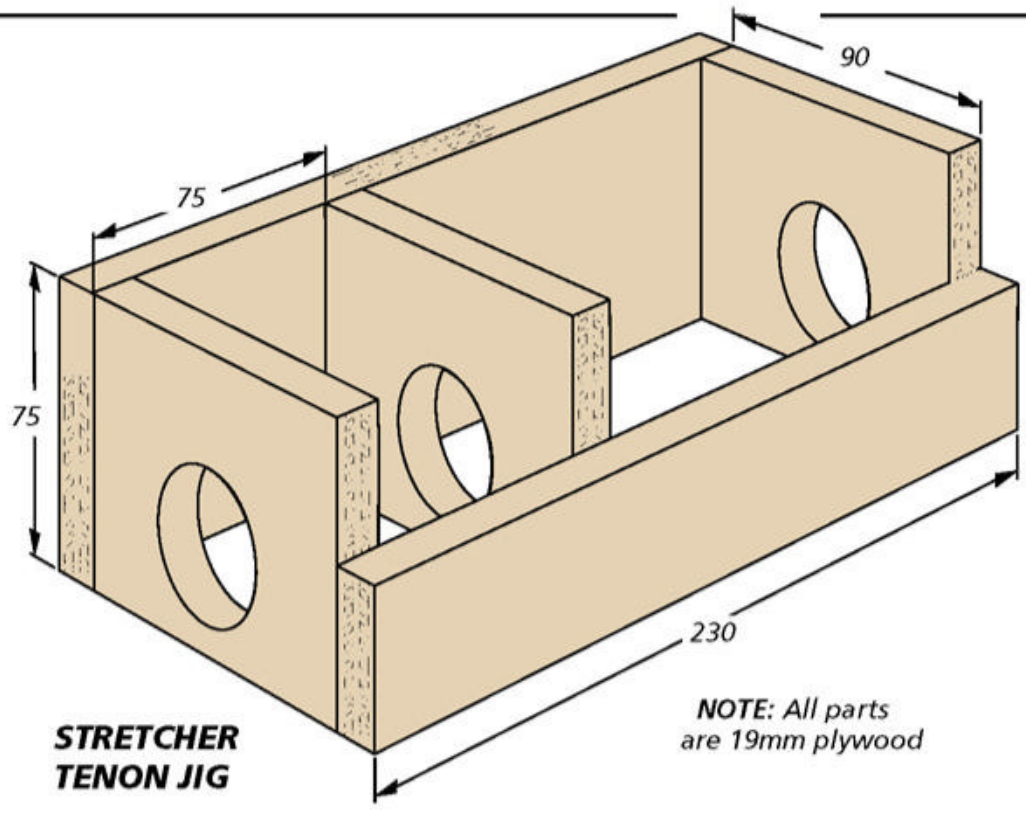
When sharpening a spokeshave blade, the goal is no different than with any other edge tool. First, you want to flatten and polish the back side of the blade. Next, you hone the 25° bevel to a razor-sharp edge. The problem is that without a good way to get a grip on the narrow blade and its protruding posts, this second step can be troublesome.

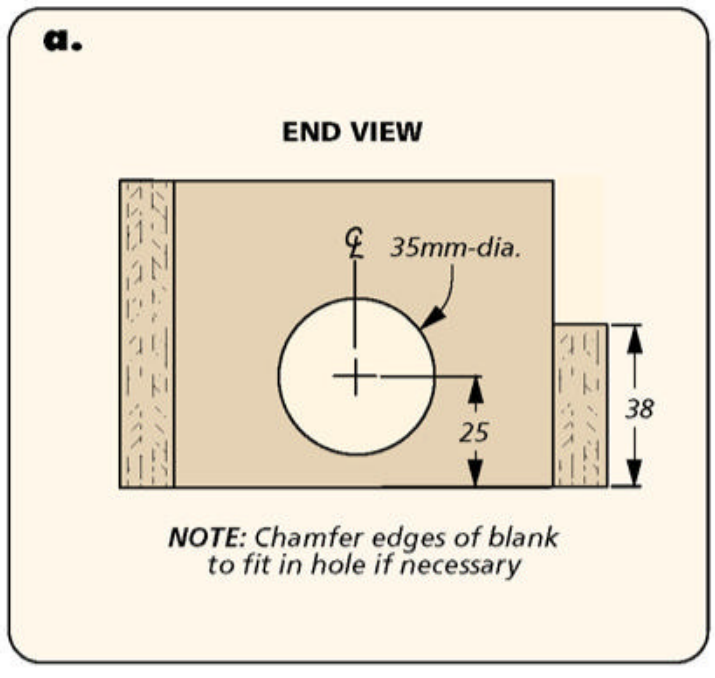
ADJUSTABLE HONING GUIDE. The solution to the problem is the adjustable honing guide you see in the photos here and in the drawing below. It does what your fingers can't do and snugly grips the blade at just the right angle. And putting a fine polish on the cutting edge is a simple matter.



A pair of cup washers holds the blade tightly in the jig allowing you to easily hone the cutting edge.







Renaissance Tool

Andy Coates says it is time to bring the versatile scraper back in from the cold.

Scrapers are something of a controversial subject. Some turners regard them as little more than a poor relation to gouges and are critical of those who use them. Why this should be eludes me.

The scraper is one of the oldest tools in the woodturner's armoury, but that does not mean it no longer has a place – far from it. Wherever there is a gouge mark or a shape to refine, the scraper is there to assist.

They are usually made from a single bar of steel, either flat or round, and have a bevel ground on them. This is not a bevel to rub as is the case with gouges, but simply a means of providing an edge and reducing the resistance to a cut made with the burr on that edge. They are a simple tool but can take some practice to master.

There are arguably three basic groups of scrapers: forming tools, which are not at all common today; finishing, or refining tools and hollowers. A forming tool is used to create repeatable shapes, such as is achieved with a bead-forming tool, for instance. A finishing or refining scraper would be something like a multi-tipped sheer scraper; a hollower might be something as unassuming as a simple domed scraper, or more exotic such as a deep hollowing tool.

Within each group there are many variants and there are also those scrapers that cannot be pigeon-holed in one group alone. The truth is the variety is almost infinite because scrapers can be custom-made to serve a single purpose. The primary function of a scraper, however, is to refine a gouge-cut surface in readiness for abrading. Let's start by looking at the scrapers.

PHOTOS: ANDY COATES

Basic scrapers

These are mostly used for refining surfaces ready for abrasion. Some variants are also detailed here.

The standard straight and round-ended scrapers can be used for refining and hollowing small end grain objects. Bevel angle, as for all scrapers, can be anywhere between 40° and 80°, and they are used without the bevel rubbing, and flat on the toolrest at a trailing angle (cutting edge lower than handle).

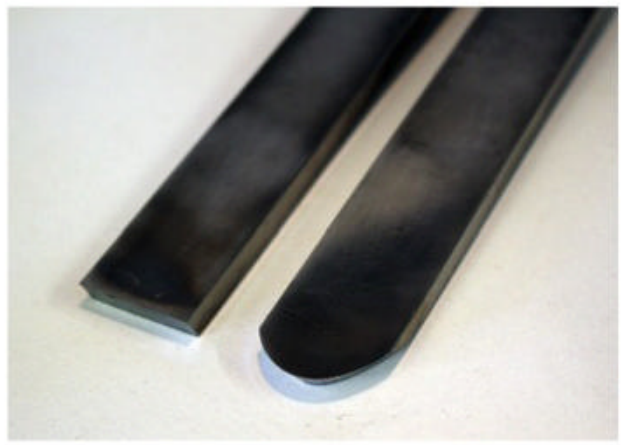
French curve-style scrapers: these scrapers can be used flat on the rest or canted to about 45° to give a shear scrape. They can be used on interior and exterior curves. A negative rake version can be ground to provide a more user-friendly scraping experience.

Box scrapers, straight and round: both also cut on the side, and can be used flat on the tool rest, or angled at 40° to 45°. They can be used for stock removal on end grain and for refining the inside walls of boxes and small vessels.

Modified scrapers: a negative rake curved scraper and a negative rake rounded-end scraper. Both have a combined angle of about 60° between the two bevels. The negative rake scrapers are ideal for hard, dense exotics, bone and acrylics. On common woods the main advantage is a significantly reduced likelihood of a catch.

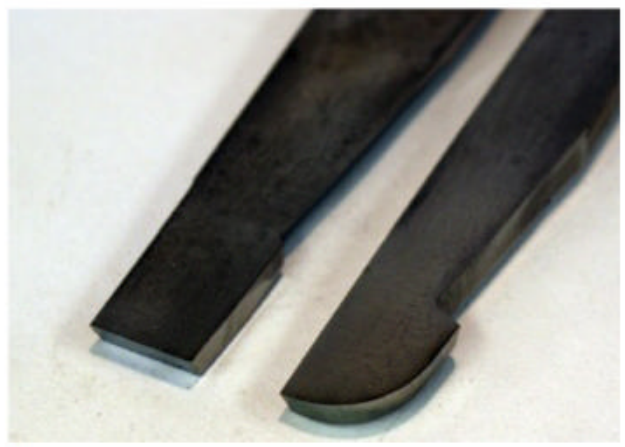
The modified straight scraper has a skewed end and side cutting negative rake box tool. The tool is used flat on the toolrest in a slightly trailing mode.

The left-hand tip leads the left-hand edge down the wall of the box and the tool handle is pushed away from the body to bring the skewed end flat in the base of the box.



▲ Standard scrapers.

▲ French curve-style scrapers.



▲ Box scrapers.

▲ Negative rake scrapers.

▲ Modified straight scraper.

CHASING THREADS

Cutting external and internal threads on a lathe is an exercise in scraping. As you can see above, thread chasing tools are made in matching pairs and are designed to be drawn across stock as it spins on a lathe.

The tools themselves are precision ground with a 75° bevel. This angle supports the teeth, while providing the clearance required to get the cutting edge up close and personal with the stock being chased.

Chasing threads is an appropriate description of the thread cutting process. On a metal thread cutting lathe you gear the lathe down, install a cutter and then engage the carriage and let the lathe cut the thread. Using hand tools to cut threads on a wood lathe is a craft and an art. You need to deftly sweep the tool across the stock, cutting deeper with each pass. On the second or third sweep the tool will engage with the path it has already created.

Cutting the matching internal thread is the most challenging aspect of chasing threads. Practice makes perfect

Goose/swan-neck hollowing scrapers.

Fixed-tip hollowing scrapers of various sorts.

Multi-tip scrapers.

Forming tools.

A copy of David Ellsworth's orginal hollowing tool.

Multi-taskers

This set comprises a wide range of variants, with roles other than simply refining pre-cut surfaces, although some can still function in this role.

Multi-tip shear scrapers of various sizes: these scrapers usually come with three shapes of head – square, teardrop and round. The teardrop tip often has a straight face for use on outside curves. These tools are a useful and cost-effective option.

Multi-tip gooseneck scrapers for hollowing the neck area of small end grain vessels through a small entry hole: these are usually used for light hollowing or shear scraping the interior of hollow vessels initially hollowed with cutting type tools. There are a range of styles and sizes of various hollowing scrapers. Some employ a fixed, replaceable tip, others are simply bent bars of tool steel. They may appear primitive compared to some modern tooling, but each has its place and use, and is often invaluable at the right time.

Forming tools: these range from an almost antique pair of forming tools to bead-forming scrapers and captive ring tools. This kind of tool is primarily used on spindle work, and can leave a poor surface which may require considerable abrasion to finish. Their advantage is the ability to create repeatable shapes of a given size and form with ease. This is a workshop-made copy of an original David Ellsworth hollowing tool. Arguably the forerunner of all hollowing tools, and included here as evidence that simplicity is not always a bad thing. As a tool it works incredibly well, and all other scraping type hollowing tools derive from it.

Grinding

Scrapers come from the manufacturers pre-ground and will be usable as supplied. In order to regrind the tool when it gets dull it is best to use a table support at the wheel of your bench grinder. Some turners maintain that the more coarse the wheel, the bigger the burr produced. However, if the top surface is polished and a finer grade wheel used, the burr produced will be more consistent, providing a finer finished surface. The compromise here is a less robust burr which will require regrinding more frequently.

The burr formed on the grinding wheel is produced on the opposing surface to the face you grind, so on a conventional scraper the burr is formed on the top edge of the single bevel. On a negative rake scraper the lower bevel is re-ground and the burr forms at the front edge of the top bevel. Negative rake scrapers can be honed on the lower bevel only to refresh the burr between re-grinds.

Some turners prefer to regrind scrapers upside down to produce a burr that is raised over the edge. The only issue with this method is the low placement of the tool at the grinder wheel. If a secure table is used this should not present an issue.

TOOL PRESENTATION

There are two basic presentation methods for scrapers:

1. Flat on the toolrest in a trailing mode – handle higher than cutting edge, and light pressure (almost just the weight of the tool) applied against the wood surface.
2. Scraper angled at between 30-45°, scraping in shear mode.

As with all tools there are subtle refinements in usage that you will discover – and possibly adopt – but for all the flat-to-toolrest presentations you must ensure that the tool is used absolutely flat on the toolrest, otherwise a catch can occur with potentially devastating results for your workpiece. The reduced resistance to the cut experienced in shear scraping mode removes this likelihood.

Scrapers in action

Now let us look at the range of uses and presentation methods.

The curved scraper can be used flat on the toolrest and on faceplate work the cut travels downhill, from the foot of the bowl towards the rim. In order to scrape in the opposite direction you will need to have a scraper ground on the opposite side.

The curved scraper can be used at 45° to the wood. The tool in this mode cuts much finer, with far less resistance to the tool edge, making it a cleaner, finer cut with far less chance for a catch.

The multi-head scraper can be used horizontal or at a shear angle on internal or external curved surfaces. The various cutter forms allow you options as to what tip to use.

The negative rake curved scraper is ideal for use on the interior of a bowl. The tool is presented flat on the toolrest in a trailing mode to produce a very fine cut which is easy to control.

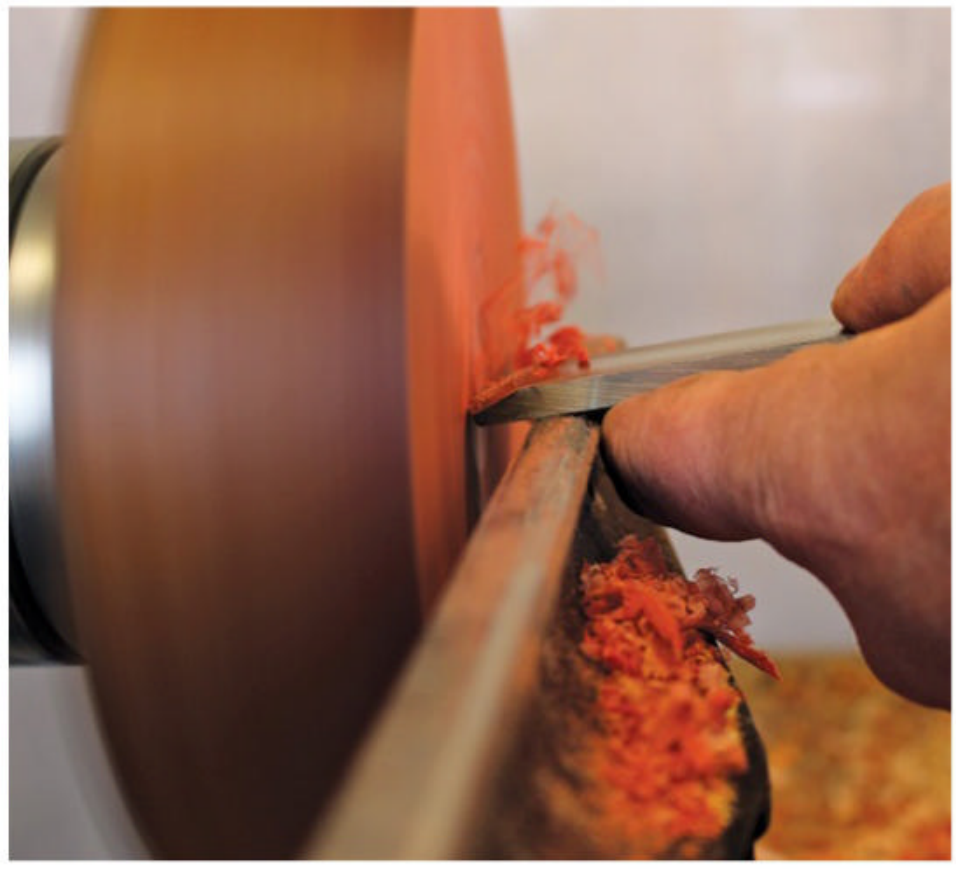
The domed negative rake scraper can be used on internal curved surfaces or to produce a flat surface. On a flat surface like platters and trays the tool is used in trailing mode on the centre axis and traverses the surface from centre to rim. A straight across scraper can also be used but the corners are prone to digging in if presented poorly.

▲ Curved scraper in use.

▲ Curved scraper used in shear-cutting mode.

▲ Multi-head scraper used in shear-cutting mode.

▲ Negative-rake scraper used on the inside of the bowl.

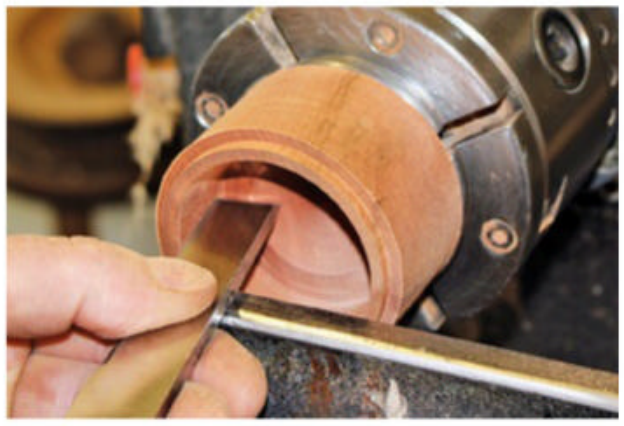


▲ Domed negative rake scraper in use.

Round-nosed scraper hollowing out a yew goblet.

Goose/swan-neck scraper allows you to hollow through restricted openings.

Shaped box scraper in use.



The modified box scraper can make delicate refining cuts.

Scrapers in action

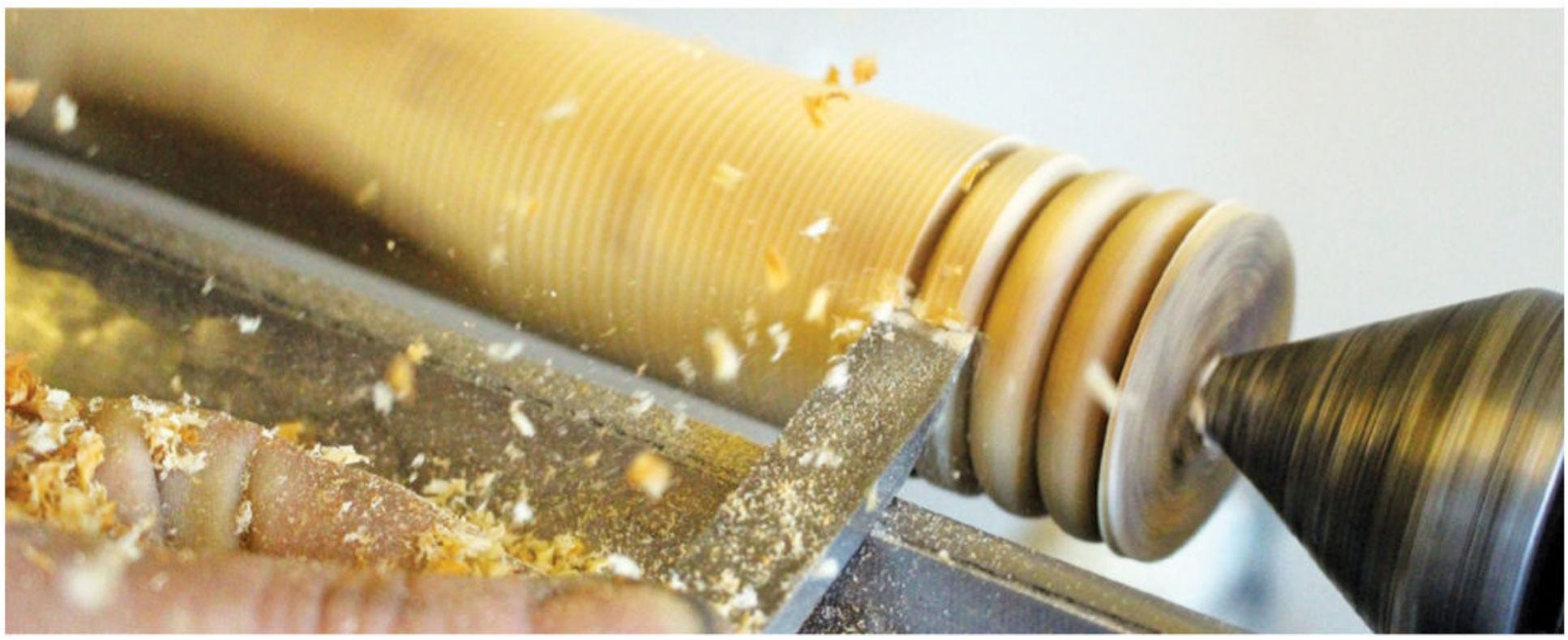
Round-nosed scrapers can be used to hollow a small work like goblets. Scrapers work very well on close-grained hardwoods and a blemish-free finish is possible. The only limitation is depth: 75mm is probably the maximum reach for a tool with a standard length handle.

Goose/swan-necked scrapers are used to hollow out forms and similar vessels. The cutter is presented to the wood at a slight trailing angle. The tool must always be supported on the straight section of the shaft only. The tool can be used for stock removal and finishing cuts.

Shaped box scrapers are ideal to hollow a shallow box. The tool is presented flat and trailing. The shaped head allows the tool to be used on boxes and forms with a shallow undercut at the rim.

The modified box scraper, skewed front and side negative rake, can be used to refine internal box shapes. The handle is pushed away from the body to bring the skewed edge straight on to the base of the box for flattening and finishing. With the handle pulled back the side edge will cut the side wall.

A bead forming scraper is typically used in trailing mode for the initial cut. As the cut progresses the handle is gently raised until the cutting edge breaches the formed bead. The finish is likely to require abrasion but the shapes are repeatable allowing for a run.



Bead forming scraper in use.

Sharpening scrapers

Let us now give some thought to the general procedures for sharpening and honing scrapers.

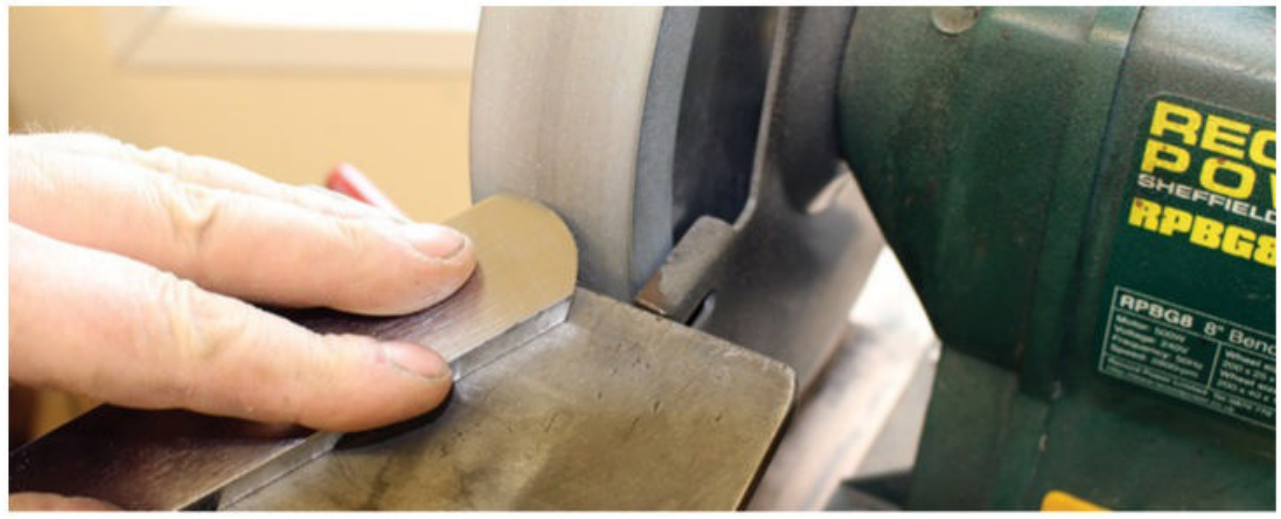
Grinding is achieved by using a supporting table at the wheel. The table should be as close as possible to support the tool fully. Ensure the table is securely locked down. Grind with a light touch. The conventional method is illustrated in the pictures below.

Here the tool is laid down on the top face of the scraper and ground upside down. Some turners prefer this method as it drags the burr up over the cutting edge producing an upstanding burr.

Scrapers can be refreshed by honing with a diamond hone between re-grinds. Hone in the direction you want the burr to be raised. A polished top surface will result in a more consistent burr along the edge, but this is not strictly necessary. When re-grinding negative rake tools only the bottom bevel is ground. This may be in the conventional or the upside down orientation and honing can be carried out to reduce the number of visits to the bench grinder.

And this is what scraping is all about: producing a clean, level surface free from gouge marks in readiness for abrading. It is not uncommon to be able to start two or three grades of abrasive finer than usual after a successful scraped finish.

NB: multi-tip and some dedicated hollowing scrapers will require the tip to be removed from the tool shaft and fitted to a tip holder for re-grinding.

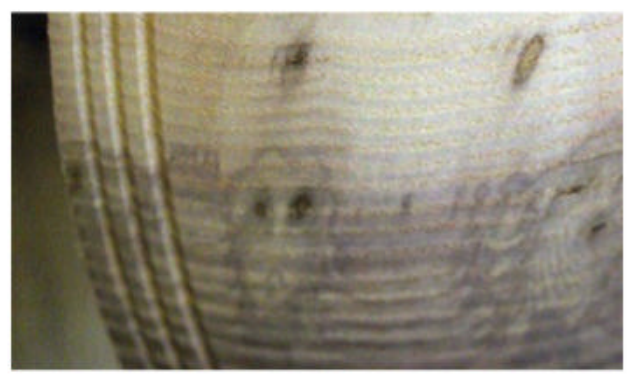


▲ The tool on a supporting table with the cutting edge uppermost to the oncoming wheel.

▲ Sharpening the scraper with the cutting edge downwards on the support table.

▲ Honing the edge with a diamond file.

▲ Sharpening a negative rake scraper.



▲ A freshly scraped surface ready for abrasives.

REMARKS

Critics claim that scrapers are prone to catching, which is perhaps unfair. A fairer assessment might be that users are prone to presenting the tool in a manner in which it can only catch. If you experience difficulties with a flat scraping tool inside bowls, consider a round-bar, or half-round, multi-tip tool. The round underside allows the tool to be used inside bowls and vessels at a variable degree shear angle, which reduces resistance to the cut and consequently the tendency to catch. If you struggle on the outside of vessels, or on spindle work, consider a negative rake version of the scraper.

Try to keep in mind that a scraper doesn't work in the same way as a gouge. It won't take a better cut if you push it into the wood. What will happen is that the burr will disappear into the wood almost immediately and the edge will dig into the wood, causing a catch. Try to develop a weight-of-the-tool policy, where the pressure applied is almost nothing other than that exerted by the mass of the tool.

Scrapers have been around a long time. Historically turners would use them on ebony and other hard exotic woods, bone and ivory because gouges cut these materials quite poorly. For a time they seem to have been virtually abandoned but more recently have re-surfaced, largely thanks to a resurgence of use by turners such as Stuart Batty, Cindy Drozda and Bill Jones, so it is due for a revival. There's much to be said for using a scraper appropriately. Why not give it a try? W

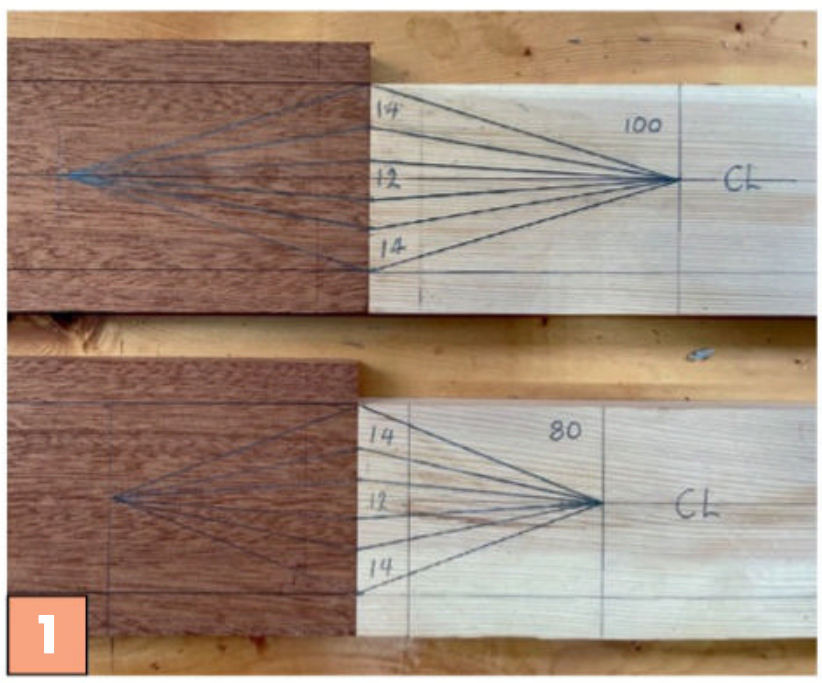
Sunrise Dovetails

The sunrise dovetails that John Bullar uses to weave his "Twisted Dovetail" jewellery box together on page 36 really are a challenge to cut!

The double acting dovetails that lock the jewellery box together on page 36 take a while to get your head around.

Dovetails usually lock on just one plane, twisted dovetails lock on two. This means that they have to be introduced to each other at a 45° angle and massaged in place. There is little room for error as the compound planes of each pin and dovetail slide together and nest as they close.

Accurately marking out and cutting these compound planes is the key to a successful joint (it took two days and eight attempts before I got it right!).



▲ The vanishing point for sunrise dovetails needs to be on a centre line. I experimented with an 80mm and a 100mm VP.

It was while following John's "Step 13" that I thought of a simpler way to draw the end grain "rays". John marks out his sunrise dovetails on the face of each piece and then uses a sliding bevel to copy each "ray" across to the end grain. This process requires that the sliding bevel be adjusted six times for each set of pins and tails. The biggest challenge here is getting the stock of the sliding bevel to butt securely in position against the face of the end or side piece while the end grain "ray" is marked out.

It might be a lack of dexterity on my part, but I did find this process difficult to execute. The technique I decided to try was to draw a matching set of sunrise dovetails on some spare dimensioned 16mm-thick stock and then to dock 16mm off the end (step 2). Butting this template section up against the inside face of the end or side piece allowed me to align the centre lines and then to strike the "rays" with ease (step 3).

MARKING OUT AND CUTTING

1 The first step is to machine the stock for the sides and the ends so they are both 16mm thick. Next step is to machine the stile and rail material for the lid so that it is 14mm thick. This lid stock is then used to trace a base line on the front and back pieces (310 x 76 x 16mm), and a base and lid line for the end pieces (230 x 90 x 16mm). The centre of the end stock is found and a marking gauge set to this point. A centre line is then drawn across the outside face of the end pieces and the front face of the side pieces. The marking gauge is then adjusted to 16mm and a line is chased all the way around the ends of each piece. At this point you need to decide on your vanishing point. I experimented with a 100mm and an 80mm VP and decided that a 100mm VP looked best. The rays for the sunrise dovetails can then be drawn. I decided that the centre pin needed to be 12mm wide, and the outer pins 14mm.

2 John transferred the ray lines onto the end grain with a sliding bevel. What I decided to do was draw a matching set of sunrise dovetails on a spare piece of 76 x16mm stock and use this as a template to mark out the end grain rays.

3 As you can see, I docked 16mm off the end of the template so that I could use it as a datum for the end grain rays. I aligned the centre line of the template and the side piece and then used a sharp pencil to strike the lines across the end grain. It is crucial that the lines are thin and fine (I drew mine firm and dark so they could be more photogenic).

4 After all of the end rays are drawn, it is time to mark out the waste sections. I used a razor-sharp chisel to define the inside of the line and then used the same chisel to slice out a bed for the dovetail saw to nest into. I then raised the stock in the vice, pivoted it so that the line I was cutting was vertical and I could see both lines at once, then I cut the sides of the pins.

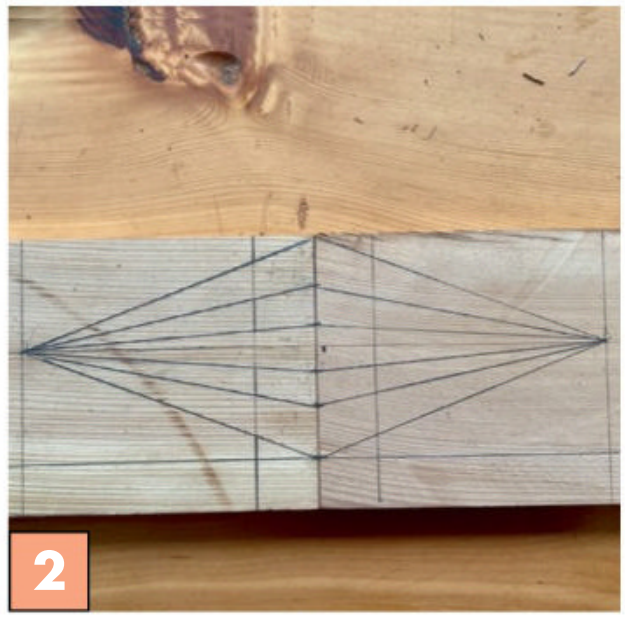
5 I found that the narrow blade of a piercing saw pivoted more easily in the kerf left behind by the fine dovetail saw. Adjusting the piercing saw so the blade was taut had the saw cut true and accurate.

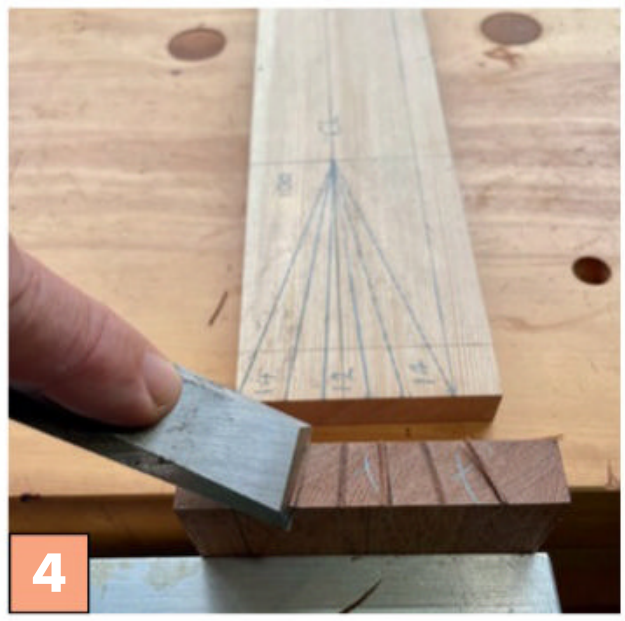
6 I used planemaker's floats to clean up each face (a warding file could also be used). Later I used the same floats to tweak the pins and the tails so that they could slide more easily together.

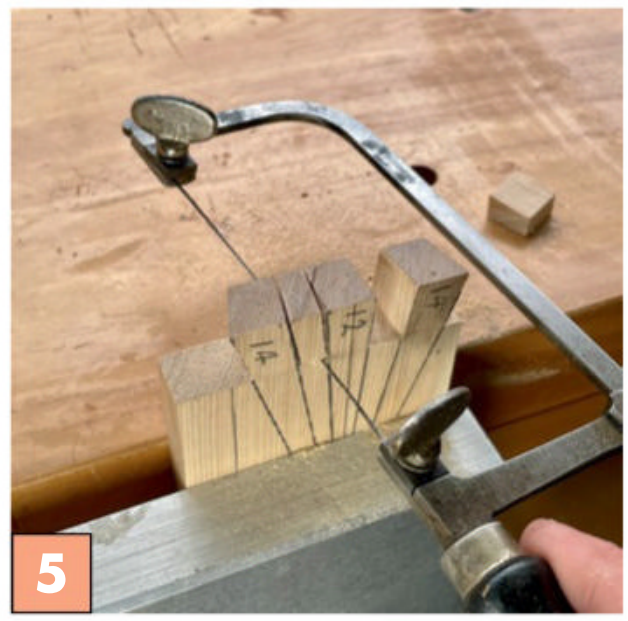
7 With the sides cut, it was time to cut the end joints. As you can see in this photo, I used the side of my clever HNT Gordon vice as a vertical datum and let gravity help me to cut to the inside of the line.

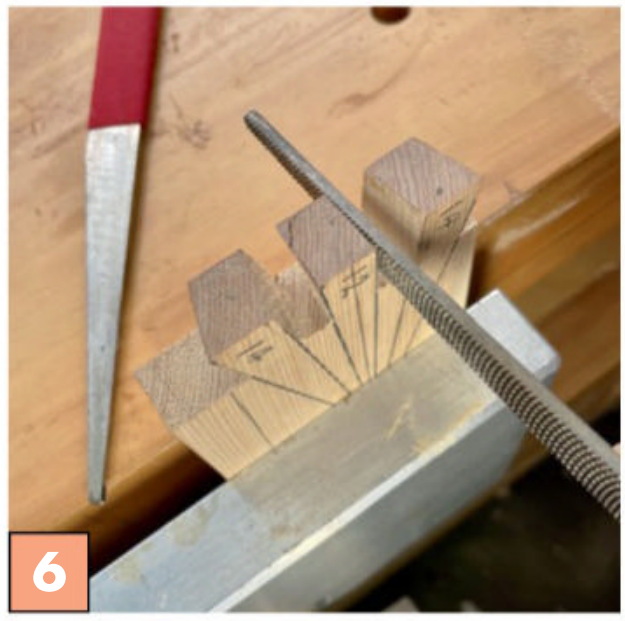
8 Each one of the four sets of sliding sunrise dovetails took time to adjust and tweak. I measured the root and the tops of each pin and tail with a dial caliper, drew new lines and then used the floats to remove the excess.

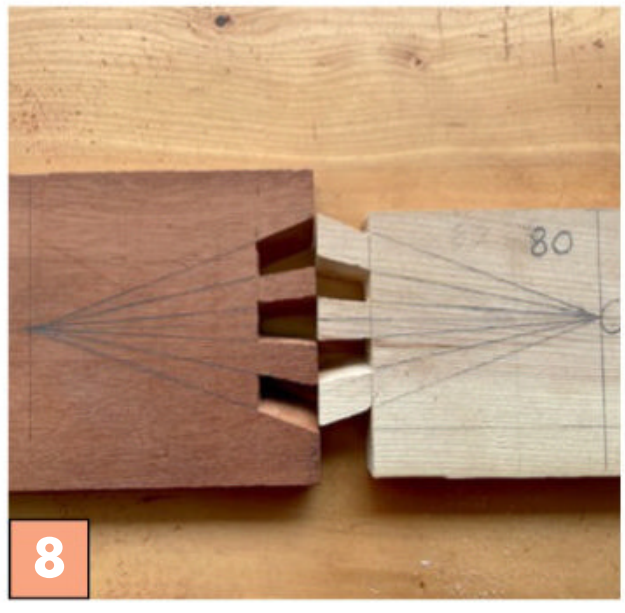
9 The inside tips of the tails and the pins were then introduced to each other and massaged at 45° until they bedded down and locked into position. W











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For more information go to our review in Boys' Toys on page 12.

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The winner of the Triton router in Issue 160 is Paul Dewhurst from Rockingham WA. Congratulations!

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What is it?
Mystery Tool

It is only when you see the manual below that the folded metal jig reveals itself to be a saw sharpening guide from the times of shillings and pence.

We got an email recently that read:

Hi, I am a member of the Bribie Island Woodcrafters Association. One of our members found this item but we can't identify what it might be or be for. We thought you might be able to help.
In hopeful anticipation you can solve our burning curiosity,
Best regards
Lyn Wymer

I sent the enquiry off to Bob Crosbie at The Traditional Tools Group and received this reply 10 minutes later (and further information on the clever designer who made it).

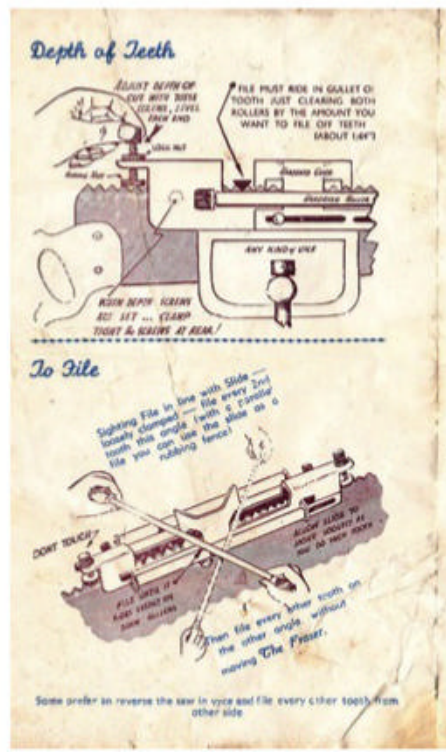
Chris,
There should be a name on it somewhere. This is a Fraser Saw Sharpening Jig. 1950s, Melbourne designed and marketed successfully in the UK. The designer anticipated any complaints by including in the instructions "for sharpening not shaping the teeth". TTTG has one in the original box.
Cheers
Bob

CHARLES HOMER FRASER

The Second World War had Australia realise that it needed to be able to manufacture just about everything it needed to survive. This spirit of independence motivated inventors like Homer Fraser, who ended up with patents for his saw sharpener as well as a chisel & plane sharpener, mitre guides and paint mixers.

It is heartwarming to see Henry Eckert manufacturing tools in Adelaide, Terry Gordon making planes in NSW and Chris Vesper crafting the world's most accurate squares in Melbourne.

Homer Fraser comes from a bygone era when "Australian Made" was common and the country had a thriving manufacturing industry. W



HARDWARE & SUPPLIES SOURCES

DIAMOND PLATE FINISHING

Japanese Tools Australia stocks the clever 100 x 50mm diamond sandpapers on page 18. These "papers" are actually diamond-impregnated stainless steel foils that have an adhesive backing. They work very well locked down onto a flat block, but can also be used to sand curved surfaces. As you would expect, they will outlast any sandpaper on the market.

Organoil is made by an Australian company that produces tung oil-based finishes that are cut with citrus solvents. They are a pleasure to use, are fragrant and best of all, produce an excellent silky-smooth finish.

Diamond whetstones (or lapping plates) are available from Timbecon, Carbatec and Japanese Tools Australia.

CHAIR DEVILS

The steel in a pull saw is both flexible and hard, perfect for making cabinet scrapers out of. Over the past decade I have purchased three Kakuri Universal Saw Sets from Japanese Tools Australia and developed a collection of gapped blades that I transform into bespoke cabinet scrapers. The hook that does all the work on a scraper is created with a burnishing tool. Timbecon stocks Crown burnishers that work a treat.

DRAWKNIVES AND SPOKESHAVES

Carbatec stocks a range of Pfeil and Flexcut drawknives, while Timbecon stocks the excellent Two Cherries of straight and curved drawknives. Timbecon and Carbatec also stock a range of Veritas spokeshaves, however, HNT Gordon arguably makes the worlds best spokeshave in their workshop in Northern NSW!

CUTTING TREADS

Cutting threads in wood is a magical process. Thread boxes are designed to cut imperial threads and are available in four sizes- ½", ¾", 1-¼" and 1-½". Lubrication is the key to success when cutting wooden threads. After you have drilled your pilot hole you should plug the base, fill the hole with boiled linseed oil and leave it overnight to soak in. Thread boxes are available from Carbatec.

WORKSHOP STOOL

Carving Tools Australia carries a range of the curved carbide discs that can be used to profile the seat of the stool. An Arbortech TURBOplane could also be used to dish out the seat.

TWISTED DOVETAILS

The tools that you didn't know you needed are a set of Iwasaki wood floats. These clever files work like planes and are designed to dress those hard-to-reach areas in complex Japanese joinery. Available from Japanese Tools Australia.

SHAVEHORSE

The geometry of a shavehorse cleverly uses the natural posture of the craftsman to lock down the stock being shaved. It is a timeless design that has been tweaked to make it even more versatile. Long bolts are hard to come by, threaded rod docked to size is the way to go. You can use Loctite on the top nut so that it acts as a bolt head, converting the rod into a bespoke bolt. The only hard to locate item in this project is the sleeve bearing (McMaster-Carr Flange Bearing-6338K422). If you make your posts out of an Australian hardwood you will not need a sleeve bearing.

RENAISSANCE TOOL

Scrapers work really well with hard Australian woods. Some woodturners convert files to scrapers. This is a clever way to upcycle a file, however files are brittle and can shatter when shocked. To reduce the chance of an upcycled file-come-scraper shattering (and becoming shrapnel) you should keep the tool rest as close to the stock as possible and make sure the scraper is always held firmly down onto the tool rest.

Chasing internal and external threads with a Robert Sorby Thread Cutter is a very rewarding skill to learn and will extend your turning repertoire. Robert Sorby thread chasing tools are available from Carbatec.

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Carbatec
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diamond sandpapers, Iwasaki floats

Prep Productions Pty Ltd
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organoil

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diamond whetstones, burnishers

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Workshop Stool. Don't let the slender, graceful lines of this stool fool you. Solid construction makes it well-suited to stand up to years of use in your workshop. Details start on page 32.

Sofa Table. Although modern in appearance, this table goes together using traditional joinery. You'll find step-by-step instructions starting on page 50.

Final details

Twisted Dovetails. John Bullar shows us how to make this unusual but useful joint. He takes you through the steps starting on page 36.

Multi-Function Shavehorse. No, this isn't a woodworking rowing machine! This traditional device helps you get the most from your hand tools. Step-by-step instructions start on page 42.

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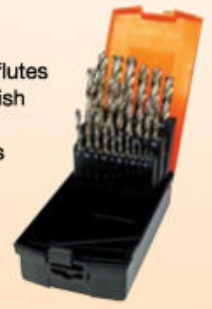

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- 12 spindle speeds
- Swivel & tilt table
- 1hp, 240V motor

MEDIUM DUTY

Order Code: D592

$440

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ERIN
Staff Member

DC-3
Dust Collector

- 1200 cfm - LPHV system
- 5 Micron fine filter bag
- Portable on wheels
- 1.5kW/2hp, 240V motor

2 YEAR WARRANTY

Order Code: W394

$418

BP-355
Wood Band Saw

- 345 x 245mm capacity
- Ball bearing blade guides
- Cast iron table tilts to 45°
- 2hp, 240V motor

HEAVY DUTY STEEL FABRICATED FRAME

Order Code: W4224

$1,199 2 YEAR WARRANTY

PT-305S
Planer & Thicknesser Combination

- Spiral cutter head with 56 carbide inserts
- 305mm planer width capacity
- 305 x 225mm thicknesser capacity
- 4800rpm cutter head speed
- 3kW / 4hp, 240V-15amp motor

AUTO-FEED THICKNESSER ROLLERS

SPIRAL CUTTER HEAD

Order Code: W612

$3,839 2 YEAR WARRANTY

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