



PHOTOGRAPHS BY THEO COOK

The pencil gauge

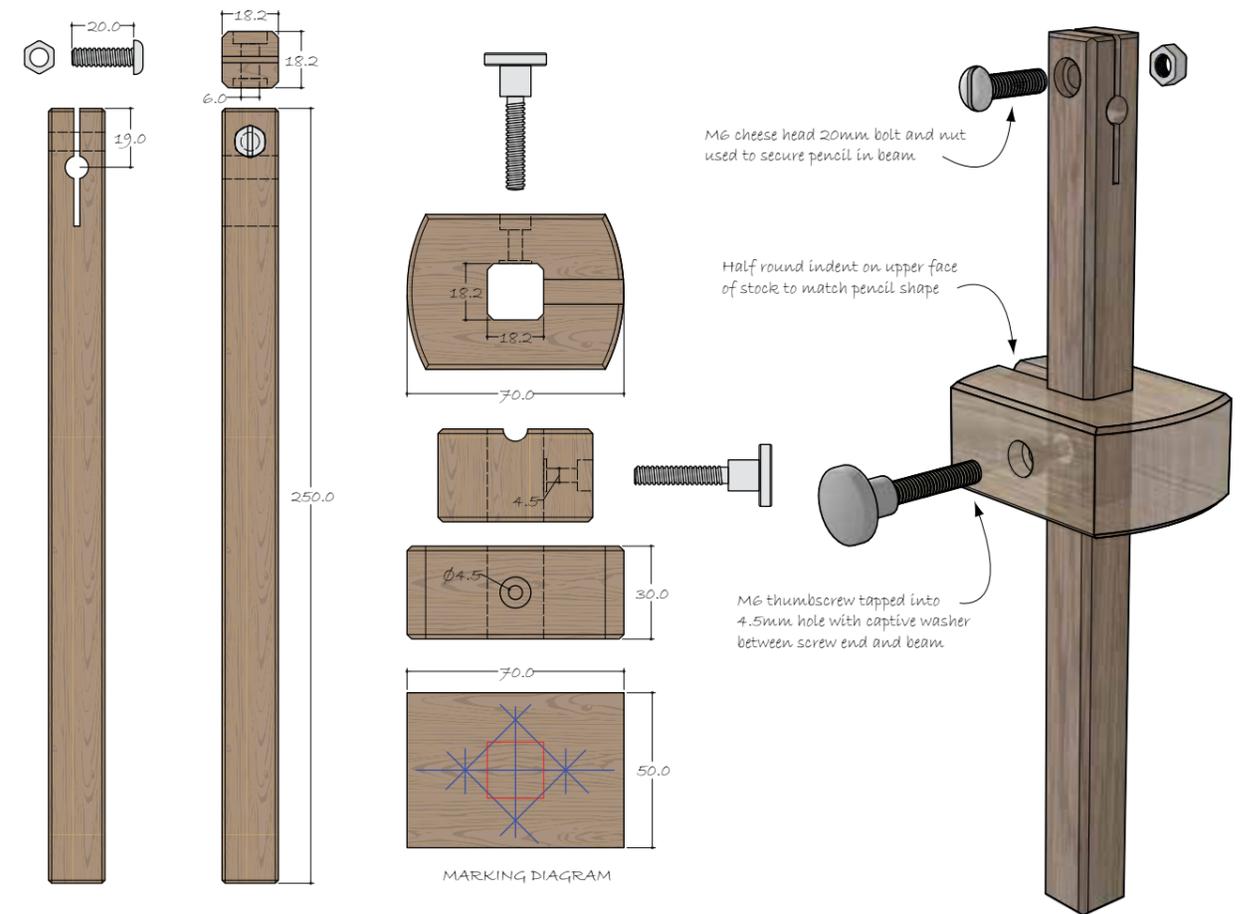
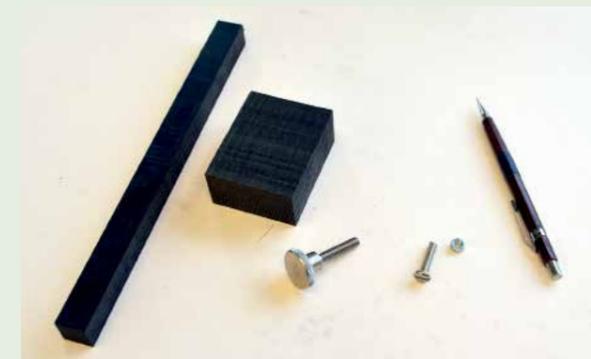
One of the best ways to master the art of using hand tools is to use them to make tools of your own. Theo Cook demonstrates a few tricks of the trade in the making of his bog oak pencil gauge

The pencil gauge is often overlooked as being a useful addition to the tool kit, but for me, it's an essential part of my layout and marking equipment. In fact I use it for marking out nearly all my woodworking joints prior to using a marking gauge or a scalpel. I'm a teacher at Robinson House Studio furniture school in East Sussex and I often let the students use my own tools so they can experience as many different ways of working as possible before settling on one that suits their style. A favourite among the students for the last few years has been my collection of 'shop-made pencil gauges. When it comes to layout, marking and measuring it helps to have a good solid

technique and a selection of tools that you can rely on. So, what better way to combine these principles than to incorporate them into a live project and make one of your own? This article is based on one of our set piece projects that includes all the elements of accurate marking, measuring and cutting to produce a tool that will become a firm favourite in your layout armoury. You could of course buy a new or second-hand marking gauge and modify that if you want but for me that's missing the point; making your own is far more satisfying and you get to choose the timber. My choice on this occasion was bog oak (*Quercus robur*).

CUTTING LIST

Components size
Beam: 250 x 18.2 x 18.2mm
Stock: 70 x 55 x 30mm



First principles

Begin by making the stock. As every face on this component is a potential reference face take the time to make sure that every face and edge is square and flat. A hefty plane and shooting board is my preferred method. If your finished dimensions are slightly less than those in the cutting list don't fret, flat and square is more important. Having accomplished this, mark out the through hole with 45° corners with a sharp pencil on both faces of the stock. If you have chosen a dark wood use some masking tape to make reading the layout lines easier. When you are happy with the layout use a marking gauge to define the hole and generate cut lines to guide your chisel later. Make sure not to extend the perimeter lines right into the corners as they need to be at 45°. It's worth checking the width of your smallest chisel before committing to gauge lines as you will need it to cut the corners. For best results use a pillar drill to drill out the waste in the hole by drilling halfway through from each side. This helps to counter any drift in the drill and avoid breakout on the exit side of the hole. I drilled four closely grouped holes using a 7.5mm lip and spur drill bit.

You are now ready to clean the hole using a chisel, creeping up slowly to the gauge lines and working from both sides. Use your layout gauge lines to locate your chisel for a final chop. A steadying block can be



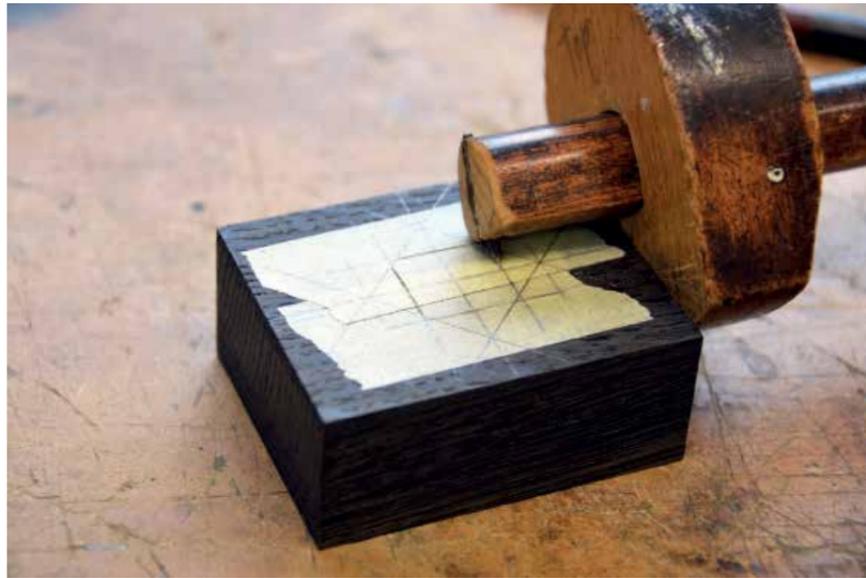
A shooting board is your best friend when it comes to dimension components by hand

used to keep your chisel at 90° to the face of the stock. Chisels can quickly lose their edge when chopping through end grain on extremely hard woods so do not rule out

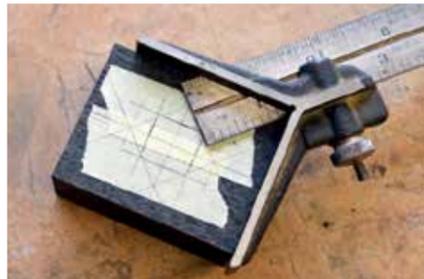
having to sharpen your chisel for the final few cuts. If you have a die square or small engineer's square use it to check the walls of the hole.



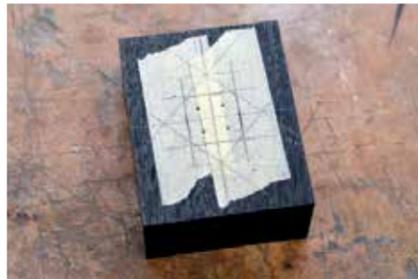
Use masking tape to highlight layout lines on dark timbers



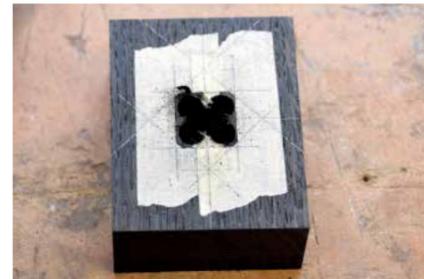
Use a cutting gauge to establish clear parameters



A 45° combination square is a great tool for generating accurate chamfers



Centre mark the holes before drilling to avoid drilling outside the gauge lines



Leave enough material to fine tune the hole with a sharp chisel



Perfect fit

I prefer to use a shooting board to plane the beam so that it fits the hole and have made a separate jig that allows me to shoot identical 45° chamfers on the corners. You may find that you are able to do this freehand or by using a dedicated chamfer plane.

Convert your shooter to plane 45° with a simple jig

Drilling for hardware

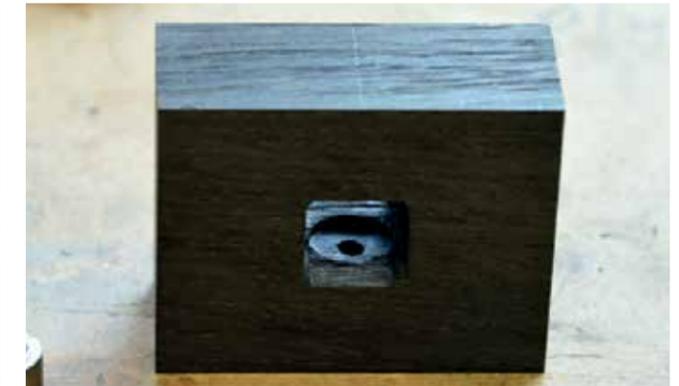
Make sure you have sourced your hardware before drilling any holes for the thumbscrew and thread. No two pieces of timber are the same and it will pay to experiment with a few test holes in an offcut of the same species to check the fit of these components. Having a selection of drill bits at 0.5mm increments or less either side of what you expect to use is also a good idea. A good engineering supplier should be able to supply you with the corresponding drill for your tapping tool. There is a huge range of thumbscrews available online from ironmongers and engineering suppliers. This one has an M6 thread and required a 4.5mm diameter hole. To prevent the thumbscrew from pressing directly onto the beam

when tightened you will need to excavate a small cavity inside the square hole to locate a washer. I made my own cutter for this job, but it can also be done with a regular chisel. If your thumbscrew has a collar like mine you may want to pre-drill a larger hole into the top of the stock to accommodate it before drilling for the tapping tool. This makes a neat step for the thumbscrew to go into and conceals the thread.

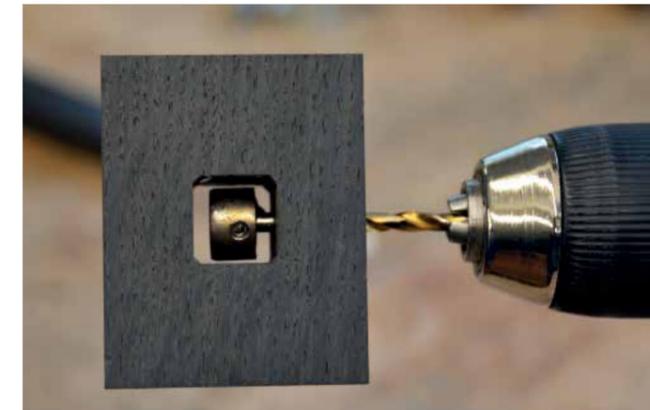
Tap the thread and test fit the thumbscrew, and shorten the length if required with a hacksaw or grinder. To avoid any damage or wear to the wooden thread from the thumbscrew remove any rough edges or burrs at the end.



Through hole and thumbscrew sleeve clearance



Create a recess to accommodate the washer



My 'shop-made solution for drilling backwards



Cut your thread straight into the wood with a metal tap

Putting the lead into your pencil gauge

You can now mark out where to drill the hole for the pencil in the end of the beam. Unless the size of your pencil is very different from mine this should be 19mm in from the end. Make sure you measure your pencil with a Vernier first to establish the correct size for the hole, it should be the same size as your pencil. For a clean hole I would use a lipped and spur tipped drill bit to drill this hole with a pillar drill.

With that done you can now mark out and drill the holes for the nut and bolt that are used to secure the pencil in place. I used a stainless steel M6 cheese head 20mm long bolt and an M6 stainless steel nut. First drill a 6mm hole all the way through the beam. Then pass the bolt through the hole and tighten the nut onto it. Use a scalpel to trace round the nut to mark an appropriate recess that will accommodate the nut flush with the side of the beam. Remove the waste with a small

chisel and superglue the nut in place. Screw the bolt into the nut to prevent the glue from clogging up the thread. The head for the bolt should also be cut in but this can be drilled.

Cut the slot in the end of the beam with a tenon saw or similar or on a bandsaw. This gap will allow the pencil to be gripped tightly.



Sink the nut and the head of the bolt into the beam so they are flush





Cut a slot to give the clamp some spring



Shape the top and bottom of the stock to suit



Soften all the edges with a chamfer

Finishing touches

You can now turn your attention back to the stock and create the finishing touches. These consist of shaping the top and bottom of the stock to suit your eye or the equipment you have to hand and softening the edges with a slight chamfer. So that I can maximise the use of my gauge and work to within a lead's width from the stock I have created a half round indent on one face of the stock to match the shape of the pencil. You can do this with either a

gouge or a rasp and finish with some abrasive wrapped around a suitably sized piece of dowel. Any surface preparation and finish should be approached carefully as sanding the beam could reduce it in size, conversely the application of a thick protective coating could cause the moving parts to bind or even transfer to your work piece. A light oil such as Osmo or just plain wax should be sufficient.



Use a gouge to create a hollow for the pencil...



... and sand smooth with some fine abrasive