BAILEY'S ROUTER CLASS

Make a window

This article is reproduced by kind permission of Woodworking Plans & Projects magazine and GMC Publications.

Anthony Bailey shows you how to cut window profiles

THE PROJECT

Normally you would get a joiner or glazing company to make up new windows when it comes to replacement time. Supposing you could make your own? A joiner would use a spindle moulder and the correct tooling to do the job, but manufacturers often have suitable cutters in their range, to make your own windows. So I thought I'd get some of these cutters in and make up a window to show you how it's done.

The router is still the most versatile power tool there is. Along with a vast range of cutters, jigs and gadgets – many of which you can also make for yourself – it can help produce high-quality woodwork.

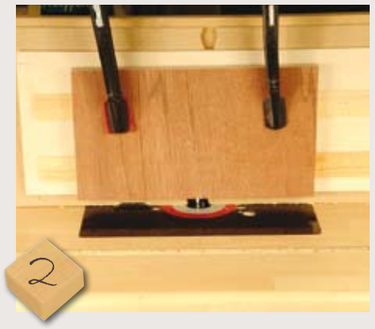
This series is intended to show you what the router can do, while assuming the reader has a general level of woodworking knowledge. We hope to show you the aspects of each project that specifically involve the router and how this great bit of kit can expand your woodworking skills.

Each month we will highlight the jigs, cutters and gadgets you will need to help you get more from this incredible machine. Feel free to send us pictures of your routing endeavours, or post them on the WPP forum at: **www.woodworkersinstitute.com**

PHOTOGRAPHS BY GMC/ANTHONY BAILEY

THE JIG

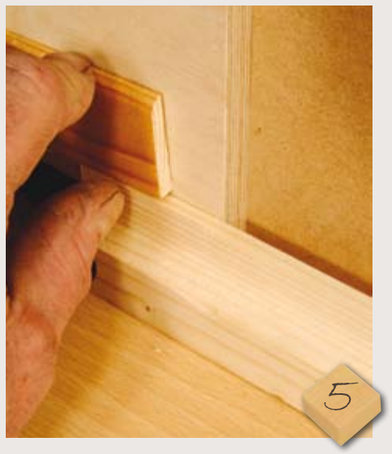
Because of the complexity of making window frames, more than one jig is required. First up is a perfectly square pushblock as described in WPP50 Mini Projects. This simple device is an underrated, but very effective, aid. It safely supports each component being scribe cut without any need for the table fence to be parallel with the table itself, as would be the case with the mitre fence



The second jig is designed to fully support each glazing bar after the rebates have been machined on the reverse side. This operation removes a lot of wood so there has to be a way to preventing vibration, tearout and a component turning over as it feeds through – all while keeping the operator's fingers safe

So, to start, machine the rebates on your test piece and find or plane a board to the same thickness as the rebate width. Check the test piece sits squarely when the board is positioned on the sub fence

Pin the board to the sub fence ensuring each component can slide underneath without riding up as it passes over the cutter



Now, find some slips of wood that are the same thickness as the wood between each rebate. Providing all components are machined to the same thickness, they should all be able to slide through without getting stuck

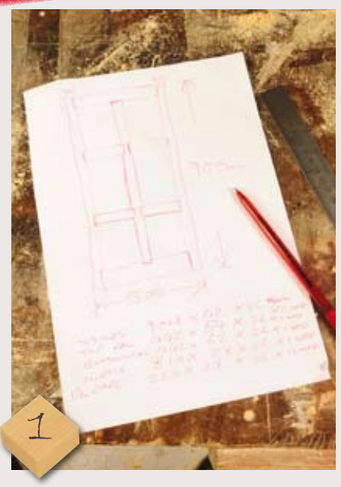
Pin the lower strip so each component can just slide under without any play. The upper strip is there to hold the front board, which is added last. This will trap each glazing bar, preventing any sideways movement and avoiding any supporting finger contact. The front board is added last

The third jig is very simple. The purpose of it is to fit tightly around each frame component, including the glazing bars. The top board is the height register so the two battens should always sit level with the moulded edge of each glazing section. This creates a sort of mini mortise box that the router can sit on, to machine the stub mortise holes. The open end allows working at the ends of the frame stiles and is clamped tight to prevent slippage

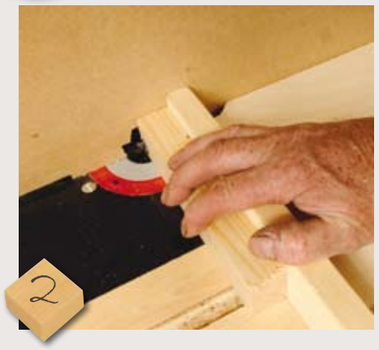
THE CUTTERS

From left to right: Wealden sash bar scribe, Trend version on ½in shank, Wealden ovolo scribe, Wealden tenoning cutter for making the rebates, and lastly a 6.4mm straight cutter

MAKING IT...



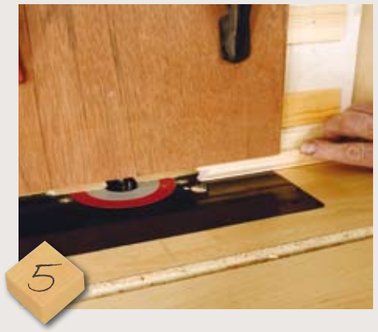
It is essential to make a precise cutting list for this process to work. Start with the overall frame size using the old frame – if it is available – as a guide to stock dimensions. Make it a tight fit as you can always trim it to fit, not the other way round. Allow for the amount that the scribed components need to fit into their neighbouring components



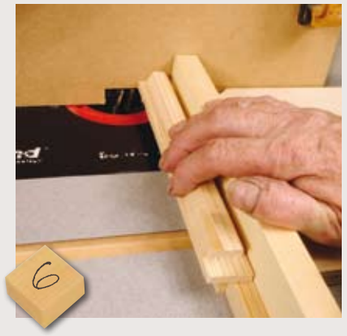
The first cut is the scribing cut. It helps to do a trial profile cut first so you can see the shape and understand how the scribed part will connect to it. Now swap cutters and do all scribe cuts using the pushblock and a through sub fence

This apparently complicated rebating set-up consists of a large bore extraction port, also acting as a hold down, and spring fingers for sideways pressure, clamped firmly so it cannot slip (see WPP50 Mini Projects). Note the spring fingers are raised up on 9mm MDF, so pressure is applied at mid-height of the glazing bars as they are rebated. One short glazing bar is used to propel the first one through and so on, thus making for safe, controlled machining

These test pieces show the machining progression from left to right: scribe cut, one rebate, both rebates



Now, using the second jig, the moulding profile is machined. The cutter needs to be set at the correct height to match the already scribed ends. The sub fence, complete with attachments, is clamped in place and the glazing bars are run underneath, first checking with a test piece that the cut width is correct. Note the stiles and rails are machined without the front board on the fence

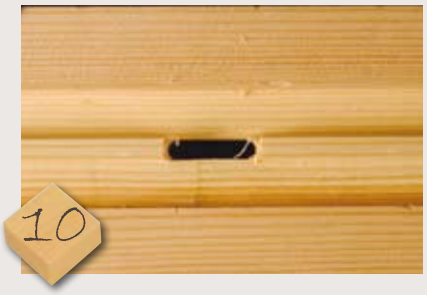


Assuming all components are successfully machined, the stub tenons need to be formed on the glazing bars and top and bottom rail. Fit the rebate cutter and set the height and depth with a plain sub fence in place. Use the push block to support each component, but this time use a slim, loose fillet of wood to fill out the rebate nearest the pushblock so it gives proper support

7 **Here is one of the short horizontal glazing bars in its finished state. The scribed end will plug into the adjacent component once a shallow mortise is machined**

8 **Lay out the components and measure and mark where the mortises need to be. Bear in mind that the rails will fit into haunched mortises, i.e. they stop short of the ends so the rails are locked in place and cannot simply slip out of place. Fit jig number three over a stile, press the top board down, and check the open end is flush with the top while clamped in the vice**

9 **Machine the mortise to depth using just one fence and, in this case, a 6.4mm straight cutter. The mortise ends are chopped square with a narrow chisel**



10 **Repeat the operation on the glazing bars but bear in mind the mortise will go right through. Again, the ends are squared with a chisel and the tenons that go into the vertical glazing bar will need to be trimmed so they meet comfortably in the middle**

11 **The rail tenons have their outer corner chopped away to fit the haunched mortise. Check the fit of all tenons before glue-up and final assembly**

12 **Clamp the window frame up tightly and check for square and that it isn't twisted. Clean up the glue, unless you use PU glue as I did, in which case clean up only once it has set hard**

Construction notes

A Conventional window joinery uses through mortise and tenons, which give added strength to the whole assembly. With these cutters, that just isn't possible. I chose instead to pre-drill through the stiles into the rails once the glue had set, and fit long screws to put the strength back in.

B Despite accurate measuring I found my short glazing bars were slightly short, so I remade them. I suspect that however much care you take, the same thing may occur. To mitigate this possibility I would add 1mm–1.5mm to each as they can be shortened with care if necessary.

C The two standard frame types are sash and casement. There isn't much to distinguish them, and joiners I have worked with call them all sashes as the construction is identical. A lower sash window has a bevelled lower 'drip' edge and grooves at the sides for the cords, while the upper sash also has the side grooves and shaped horns where the stiles extend beneath. A casement or hinged window may have a rebated profile with drip grooves that plug into the outer frame. ■