



PHOTOGRAPHS BY MICHAEL COLLINS

Small sliding lid box

Our American correspondent **Michael T Collins** thinks inside the box with this object lesson in box construction

I have been fascinated with boxes for as long as I can remember and have amassed quite a collection, ranging from simple rectangular boxes to more complex sculpted puzzle boxes that I have long since forgotten how to open.

In this article I am going to take you through the steps of creating a simple sliding lid box using some new techniques. The size can be as large or small as you like. This box will be 75 x 63 x 230mm made from a scrap of white oak (*Quercus alba*) 12 x 63 x 660mm. The top and bottom are made from a piece of rip-sawn cherry (*Prunus serotina*).

So far in this series we have looked

at large joints. Making this box is going to require some finer joinery and will be less forgiving. You might want to practise the techniques covered using softer wood such as poplar (*Populus spp.*) or pine (*Pinus spp.*).

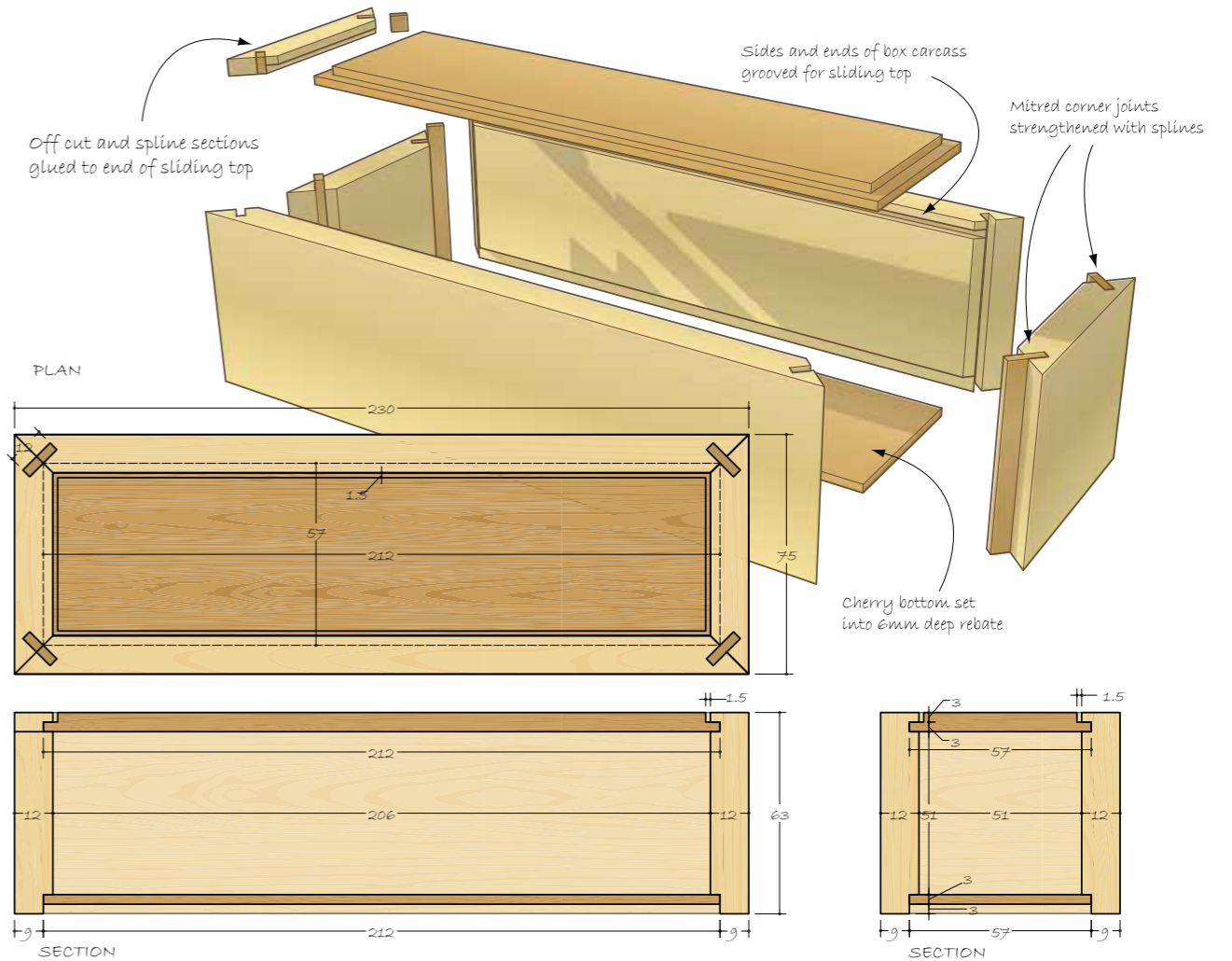
There are many ways to join box corners, from a simple butt joint, lapped joints and finger joints through to dovetails. But if you want an unbroken flow of the wood's grain around the corners, the only one available is a butt mitred joint. We could also use a 'secret' dovetail – one where the dovetail is hidden inside the mitre – but this is a much more complicated joint to execute.



Some of the boxes in my collection

What you will need:

Time to add three new 'necessary tools' to the toolbox: a combination square, cutting gauge and a homemade mitre box. You will also need a combination plane or plough plane, 3mm and 6mm cutter, block plane, crosscut and tenon saw. A couple of extra clamps would also be useful.



The problem with butt joints as we saw in issue 3, is that they produce a very weak joint unless some additional mechanical device is used. Although, having said that, I have several boxes whose mitres are simply glued and have lasted many years – it all depends on the 'abuse' that the box encounters. One trick I learned is to spread some watered-down PVA glue on the mitre cuts and let it soak into the wood. Once dry, the glued joint will hold much better.

But let's look at a more secure method – enter the spline joint.

The spline joint

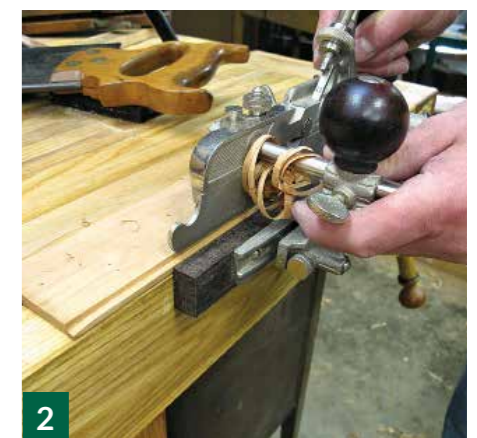
This joint is similar in construction to a tongue-and-groove joint, but instead of a tongue it consists of two matching grooves lined up and facing each other. A thin piece of wood – a spline – is then glued between the two grooves.

Cutting the lid's groove and bottom rebate

1 Bring the wood to final dimension, marking the face and edge. It's much easier to cut the groove and

rebate while the wood is still in one piece – planing a groove in a short piece of wood is fraught with difficulties. Using the combination plane and a 3mm cutter, set the fence to 3mm and the depth stop to 3mm. Plane the groove starting at the end furthest from you and working back towards yourself. Place the wood at the edge of the bench so that the plane's fence can reference off the bench and wood's edge. Pay attention to the grain direction – you want the grain to be rising up and away from you. However, working with wood is always a compromise; the grain will be with you in one direction but against you when you plane in the other direction. If you have unruly grained wood use very sharp cutters and take thin shavings.

2 The rebate or shoulder is cut using a depth of 3mm and 6mm wide. Once the groove and rebate have been cut, the mitres can be cut. To do this you will need a mitre box – this can be bought but it is very easy to make your own. ➤



Making a mitre box

3 Very accurately create a U-shaped box with sides and bottom secured with screws, from the side, at 90° – the height needs to be greater than the wood you are going to mitre. Then with a combination square mark two intersecting 45° lines – carry these lines down the sides. Then, very carefully, saw vertically down with your crosscut saw.



Box layout

4 Lay out the four parts of the box in the order they will form the box, this will produce the desired wrap-around grain.



5 Use a crosscut saw to cut the mitres. Always saw from the face side to avoid tear-out, which should be minimal due to the fine saw kerf. Number the pieces to keep them in the right order and orientation. Use the block plane to lightly clean the mitre's surface. To avoid tear-out, plane at an angle so that the fibres are sliced. One of the end pieces needs to have the section above the groove removed – use a fine kerfed saw to cut off the section above the groove. Keep this piece as it will be needed later to form the end of the lid.



Planing the spline groove

6 The spline groove which is cut into the end of each mitre is 6mm deep x 3mm wide, which when assembled will give a 12mm slot for the spline – this is a very tricky process so make a few extra pieces to practise on. Tightly clamp the adjoining corners face side together, making sure that they are square and form a 90° angle. With the combination plane set the depth stop to 6mm and the fence offset so that the groove will be in the deepest part of the mitre. Carefully plane the end grain just enough so that you can see where the cutter will exit the wood. At this point, score both sides of the exit ...



7 ... or use a scrap piece of wood to eliminate tear-out as the cutter exits. A razor-sharp cutter is needed here. Take your time planing the spline so that again any tear-out is kept to a minimum. Repeat this process for all the grooves.

Making the top and bottom

8 The top and bottom are ripped from a piece of 12mm thick cherry. The top is 6mm and the bottom 3mm.



Marking the location of the saw cut with a marking gauge, place the wood in the vice at 45° and rip. Pay attention to the start of the cut – if the saw seems to be drifting off course, twist the saw in the direction of drift – for example if the saw is drifting to the right of the line twist the handle to the right (clockwise) to pivot the saw back on track.

9 Once ripped, plane off the saw marks...

10 ... and cut both pieces to size. The top will need to be 6mm wider and longer to account for the 3mm groove. The bottom should be a hair under the distances between the rebate. For the lid, use a cutting gauge or set the combination plane's knicker to mark a 5mm rebate on the end grain, this will prevent the fibres from tearing as the plane slices across the grain.

11 A 5mm rebate will give a 1.5mm gap around the lid – make this a hair over 3mm if you want a tight-fitting lid. Adjust the depth stop to 3mm and cut the lid's rebate. Glue the piece that was removed earlier to the lid securing it with masking tape and placed it under a weight.

Making the splines

12 The splines are 12mm x 3mm and cut from the extra wood of the top – I use a cutting gauge, from both sides, to 'rip' the pieces – you could also use a knife and a straightedge.

13 Assemble the box and insert the splines to test the fit – the splines should slide in without being forced.

14 They should be slightly less than 12mm so that the mitred faces come together with room for glue. Bring the size down using a block plane. With small pieces, it is easier to hold the plane upside-down and pull the spline across the sole of the plane – just watch out for the blade!

Glue up

15 Make sure that you have the pieces in the right order and facing the right way up. Glue the splines in place first then glue the bottom in – gluing the bottom in will ensure the box is square. ➤



16 Depending on where the splines fall in the mitre, you may need to trim the bottom corners because the rebate cuts into the spline area.

17 Use cauls to protect the wood – I cover mine in electrical tape, which resists glue adhesion. Check for squareness.

18 Once the glue has dried, fit the lid again. Depending on where the splines fall, the corners of the lid's leading edge may need to be trimmed off, alternatively, the small piece of spline that's in the groove could be carefully removed. It certainly needs to be removed where the lid enters the box. Use a slicing action to do this.

19 To complete the look – a small piece of spline can be added to the lid.

The finish

20 Bring all the splines flush and ease all the edges with the block plane, then sand the whole box following the grain with 220 grit and wipe off the dust with mineral spirits.

21 My go-to finish is an oil varnish mix – two or three coats, the first of which is liberally applied and allowed to soak in; any excess is wiped off with a lint-free cloth. Lightly sand with 320 grit between coats, wiping off the dust with mineral spirits. Be particularly careful not to get too much finish in the lid's groove. Once dried apply a good quality furniture paste wax and buff to a shine.

Box making offers endless possibilities so why not get in the 'groove' and make yourself a classic sliding lid box. ■

Michael T Collins

British-born Michael has been working with wood off and on for 40 years. He moved to New York in 1996 and over the years, has made bespoke furniture, including clocks, inlay work, Adams fireplaces, book cases and reproduction furniture.

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Disposing of finishes

Since most finishes contain Volatile Organic Compounds (VOC) it is important to dispose of the cloth following the manufacturer's instructions – I lay mine out flat on a cement floor until dry.