



## Scott Horsburgh Designer and Maker of Fine Handcrafted Furniture

Article 9: 5th November 2008  
Piece: Display cabinet on a stand  
Subject: The making of the drawers

Drawer making and fitting is a subject that would best be handled in a full length dvd, and that is my intention. However as a start I will discuss some of the basics here.

Fine furniture makers refer to their drawers as being 'piston fit'. This is a very explanatory term and sums it up. The drawer will fit the carcass snugly with virtually no sideways wobble as it is being removed. The further you remove the drawer from the carcass, the less datum surface you have to hold the drawer, yet the fit will remain snug.

In 1995 I saw a small cabinet on a stand at an exhibition in southern England. The cabinet was made of Yew and the maker was Alan Peters. The cabinet had quite a few drawers as it was for jewellery and small collectibles. The fit of the drawers was sensational. They say that the test of a good piston fit drawer is to be able to place your little finger on one of the bottom corners and to be able to push the drawer home easily and smoothly.

So how do they do this??????? Firstly the carcass must be built accurately to enable this firmness of fit and secondly the drawers are made fractionally oversize and then planed to fit. This is a lot of fun and incredibly rewarding. Piston fit drawers are one of the most impressive aspects of fine furniture. You may also wonder how such drawers can fit so tightly and continue to function as the seasons come and go and the humidity changes. Don't the drawers bind and swell? This is where understanding wood movement is crucial. If you join the carcass correctly it will not alter its front and back openings. It will only change its depth. This is with solid wood only. Veneered surfaces do not move. That is why if your carcass is solid wood, as the display cabinet is, you would not use the back of the carcass as a drawer stop. If you did use the back of the carcass as the drawer stop, when the summer comes (Australian Summer) and the humidity drops the carcass

will reduce in depth and the drawer may protrude further out the front than intended.

### **THE CABINET CARCASS:**

So we are making a carcass that is intended to house drawers and we want those drawers to be as close to a brilliant piston fit as we can. We're using Alan Peters as inspiration and striving for perfection.

The drawer base runs on 'drawer runners', the sides run up against the 'drawer guides' and the top runs up against the 'kickers'. The 'kickers' purely prevent the drawer from tilting too far downwards.

In the display cabinet, the carcass sides acted as the 'drawer guides', the carcass base acted as the 'drawer runner' and the slid in shelf acted as the 'kicker'. A lot of care was taken with the preparation of the interior surfaces of the carcass as the accuracy of these would determine the action of the drawers. David Charlesworth was the man who guided me in the making and fitting of my first attempt at a piston fit drawer. David mentioned to me that he liked the drawer to tighten very slightly as it neared being pulled out. This gave the user a warning that the drawer was very near being completely removed. The key to having a drawer tighten slightly as it nears being removed is to have the back carcass opening very slightly wider than the front. This will enable the drawer to bite a little. I have also read of makers who prefer a straight parallel opening all of the way through with both openings (front and back) similar in width.

For the display cabinet I made the back opening 0.3mm wider at the back than the front. How did I do that? After I had accurately prepared the four carcass members and was ready to mark out and commence cutting the single lap dovetails, I placed the top and base pieces together as they would go in the carcass. That is with the front edges together and the inside face sides touching each other. I clamped them together so they would not move and placed them in the bench vice. I then took two shavings off each side commencing at the front edge and planing through. I made sure I gently lifted the plane before reaching the back end. I used a straight edge to ensure the sides were still flat and then took measurements along the front edge and back edge to determine the difference in length. Now I was ready to commence marking out and cutting the joinery.

On the sideboard I am currently making I will be screwing the drawer guides and kickers onto the leg and rail carcass and allowing veneered surfaces to be the drawer runner. Screwing the guides allows you to very easily alter the width of the drawer opening by simply planing the guide where need be and then screwing it into place. I want the drawer to run on a surface veneered with 0.6mm commercial veneer. This makes me nervous as the veneered surface is so thin and I don't want the repeated action of a drawer being pulled in and out to eventually wear through the veneered surface. So what can I do to prevent this? I will be inlaying some thin strips of Cooktown Ironwood into the top surface of these

'drawer runner' panels where the base of the drawer side and drawer slip will sit. These dense wood inlays will be planed flush with the veneered surface and the drawers will run on these strips. Cooktown Ironwood is like concrete. It will not wear so the drawers will run smoothly.

To help me accurately determine the front and back drawer openings on the sideboard I will shoot a thin piece of wood to fit the front opening exactly. I will then use this piece to show me the width of the back opening. I will aim for the length of the wood plus a couple of sheets of paper. This is a very accurate method of ensuring your openings are just as you want them to be. If you want the openings to be parallel and uniform throughout then forget the paper and have both the front and back opening perfectly match that piece of wood.

### **MAKING THE DRAWERS:**

The drawer making process for the sideboard will be filmed as there are details which are far easier to show with video than to explain with words. I would firstly like to mention the components of a drawer. The drawer has two sides, a front, back and base. The back is smaller in height than both the sides to allow the base to be slid in from the back and then fixed to the underside of the back, and also it is lower than the tops of the sides to allow air flow. If the drawer sides are to be thin it is wise to use 'drawer slips'. These will increase the width of the drawer running surface as the drawer runs on its sides only. The drawer slip will also enable the back to be slid in without compromising the strength of the drawer sides as the rebate for the drawer base is routed into the slip and not the thin drawer side. I have used English Oak drawer slips which you can see in the photos below. See pictures below:



The drawer base is slid in from the back and is slot screwed into the drawer back to allow for seasonal movement. Notice how the grain runs long ways from side to side. If it ran length ways from front to back, when summer came and the wood shrank across its width, the base would pull away from the drawer sides leaving gaps along the edges where the base slots into the drawer slips.



Let's start with the drawer sides. Choose a face side and face edge and plane them ensuring that all wind is removed. The face side is the inside face and the face edge is the bottom edge. It is best to use quarter sawn wood that is hard and stable. English brown oak is perfect. For the display cabinet I used Himalayan Cedar. This wood was too soft in hindsight. I found it to be very crumbly and not a good choice for drawer material. For the sideboard I have some quarter sawn Tasmanian Huon Pine. I bought several pieces quite a few months ago and then used the bandsaw to re-saw them. I was concerned about any stored tension that may exist when I was re-sawing. If the pieces bowed too much after re-sawing then they could not be used. I let them sit for several months and then re-machined them. They are now sitting on thin stringers so that they will be fully settled when I come to use them.

In selecting the face side and edge which is the inside face and the lower edge, make sure that when the joinery is marked out and cut the outside faces of the sides will enable you to plane from front to back when planning to fit. This is important.

After planning the face side and face edge and re-machining, I use the shooting board to shoot the top edge to fit the drawer opening on its relevant side of the carcass opening. Remember that the drawer will change its height so this top edge will also be planed down when the drawer is made. Shoot the sides to fit nice and snugly. Just slide them in and you can see and feel the fit. Place them together and make sure they are the same size. If not plane the high one until they are a

mirror image of each other. An important thing to note here – try and leave the fitting of the overall cabinet back to the end. Fitting drawers is much easier without the back in place as you have front and rear access.

You can also cut the sides to length now and shoot the end grain to ensure it is smooth, square and clean.

The drawer front – If your carcass opening is parallel, fit the drawer front to the front opening. If you have a slight taper, use the back opening to determine the width of the drawer front. Using the back will have the drawer front slightly oversize. Now comes some fun. Check to see how the bottom edge fits along the rail, carcass base or shelf. Try and get a good match. Using your shooting board, shoot the left hand edge with a slight inward taper. The aim here is to fit the front very slightly into its opening like a cork – so the inside edges just fit into the opening. When you have the left hand side slightly tapered, do the same on the right hand side until it just begins to fit. Also fit the top edge with a small taper. When done, the drawer should fit into the opening several millimeters with the slight taper preventing it from fully entering.

Fit the drawer back to the back opening using the same method used for fitting the drawer front.

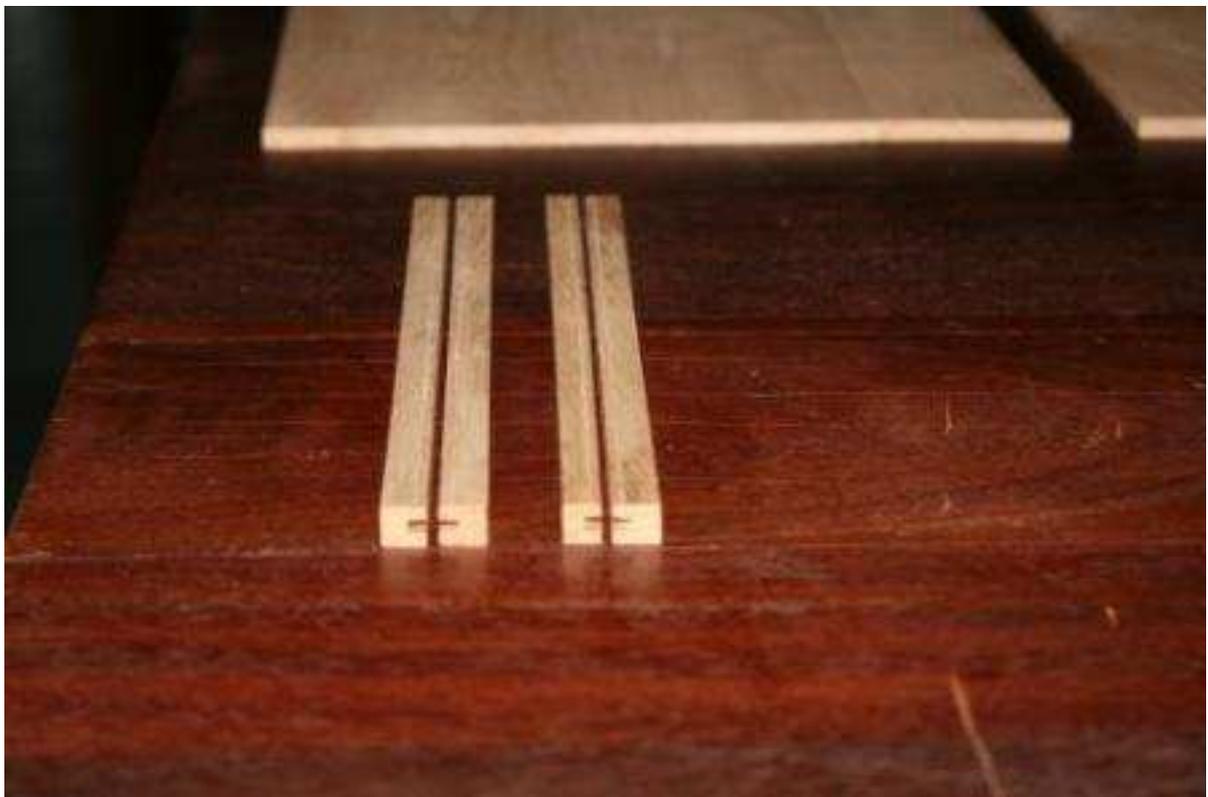
The drawer slips and drawer front are routed to house the drawer base.

The marking out of the dovetails, their cutting, the glue-up, fitting and finishing will all be covered by an in depth dvd where it will be much easier to demonstrate exactly how this is done. When gluing the drawers I do not use clamps as the pressure can very easily distort the drawers as the drawer sides are quite thin. When marking out for the dovetails I will ensure that the sides protrude from the ends of the front by a fraction of a millimeter so that I can plane them down and clean up the dovetails before the final fitting.

Below: Drawers glued up and just held in position. The square helps me ensure everything is accurate.



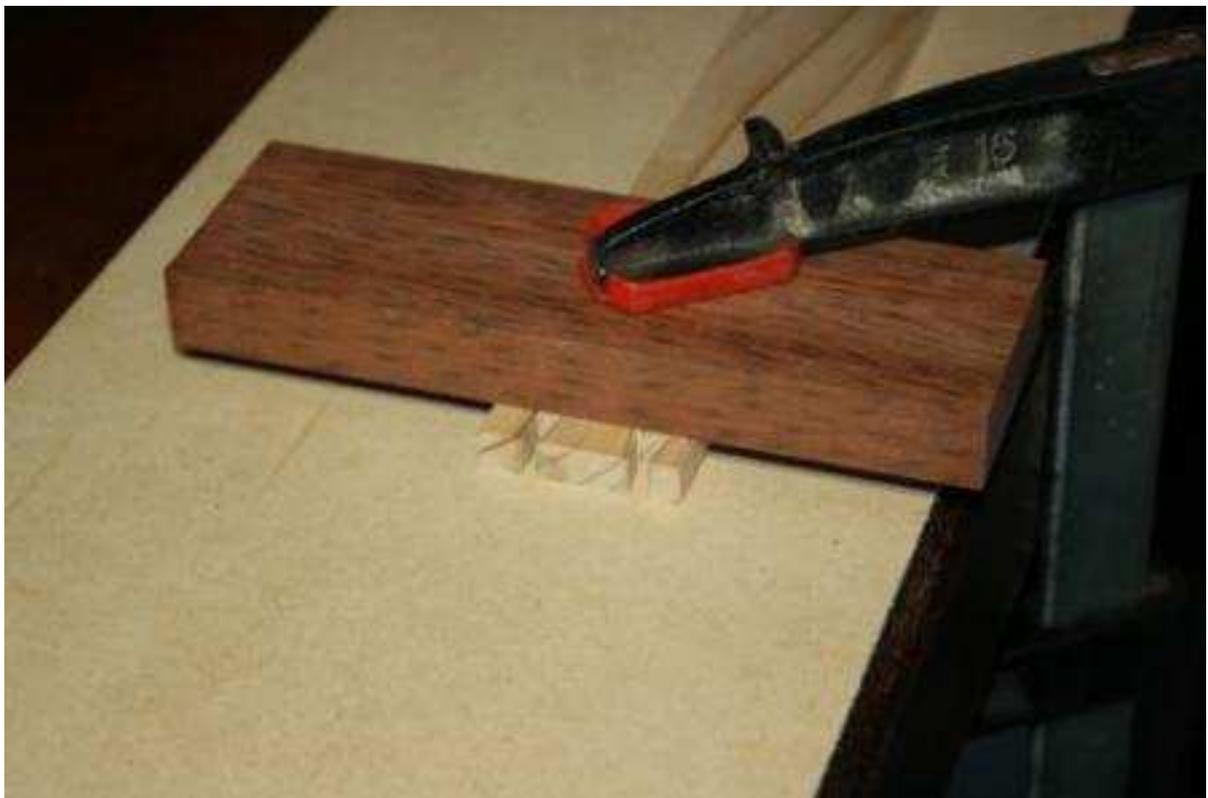
Below: English oak drawer slips. At the rear are the drawer bases which are Tasmanian Celery Top Pine.



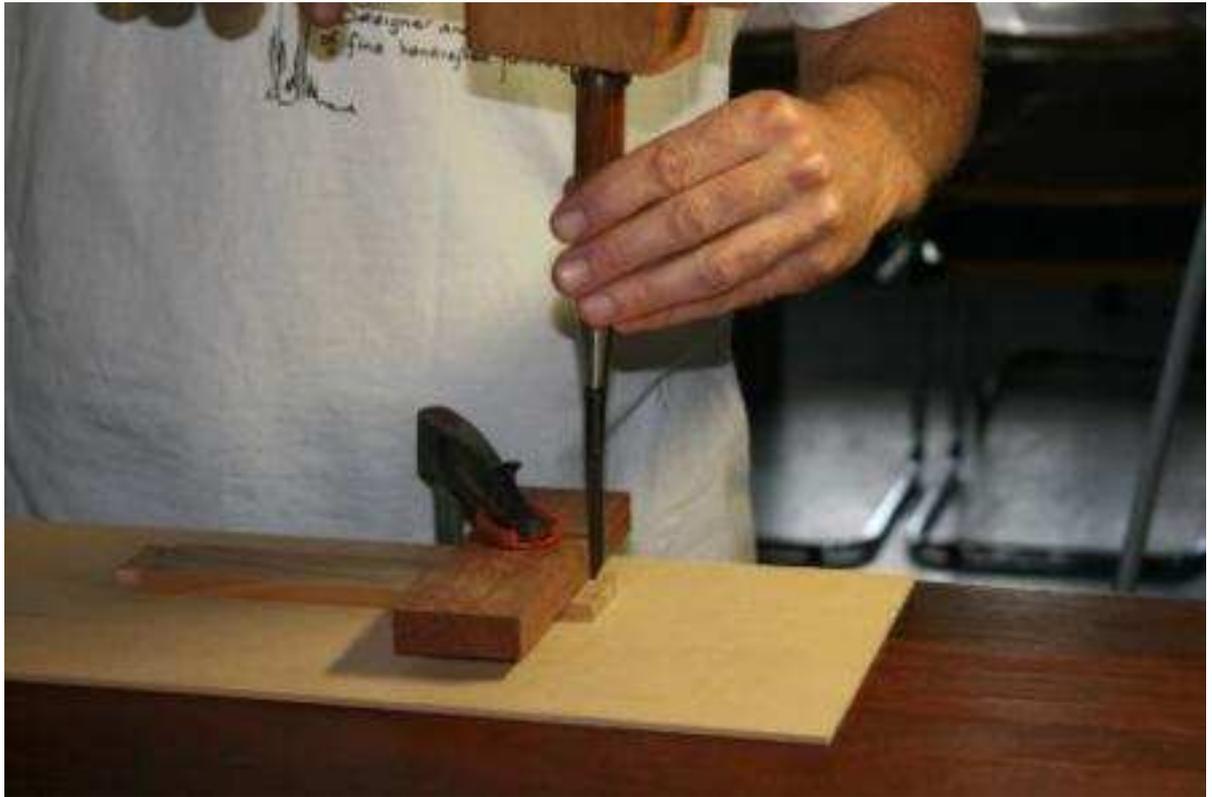
Below: Using a coping saw to remove the majority of the waste from the pins.



Below: A straight edged piece of wood being used as a guide to ensure accurate cutting to the gauged line.



Below: Chopping to the gauge line.



Below: Paring to the knife line.



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