

PHOTOGRAPHS: STUART LEES

The finished coin cabinet…the perfect excuse to expand your collection.

Coining it

MAKE A COIN COLLECTING CABINET.

By Stuart Lees

Whether you are a numismatist, a notaphilist or a coin collector, many homes have collections (of varying degrees) of coins and notes.

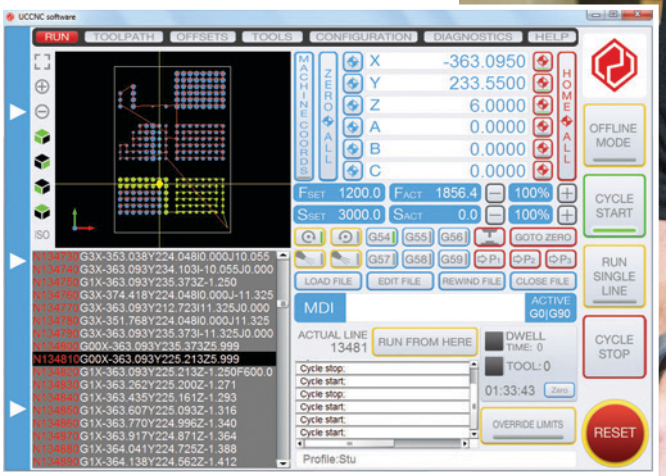
It may be the left-over change kept from one of many overseas trips, or a collection handed down through the family. Perhaps you are intrigued by the various commemorative coins that are produced and passed into circulation, or prefer coins or notes that are no longer seen "in the wild", having been withdrawn from circulation (and no longer legal tender).

While many collections are tossed nonchalantly in the back of a drawer, they can build to a point where a little more attention can be justified and, at that point, the real collecting bug can easily take hold.

While this collecting cabinet has been specifically designed around coin collections, you can modify the design to suit your particular interest, such as rocks and minerals, shells, etc.

I've opted for a design that maximises storage capacity, while still individually displaying each coin. Furthermore, I was interested in having the display made so each coin had a specific home, rather than being placed in a generically sized box. I have made each tray from a clear acrylic sheet, machined on a CNC router, as an interesting alternative way to display the coins, but you could choose another material if you prefer, such as MDF with a veneer covering and a felt-lined cavity. This particular unit will store 1200 coins, so you can scale the design based on your particular collection (or its anticipated size).

The design incorporates two quite different techniques for curving timber: one decorative, one mechanical (and both can be produced on a tablesaw/router table). The storage cabinet revisits the tambour door (used to make a tambour sun lounge, *The Shed*, February/March 2015) in a much more traditional way. It also demonstrates kerfing—a technique for curving timber that doesn't require a complicated setup and can be produced



A screenshot of the CNC control programme for cutting the holes for the individual coins.



Fitting a plastic cutting blade in preparation for cutting the trays.

on a basic tablesaw or sliding compound mitre saw (SCMS).

Coin trays

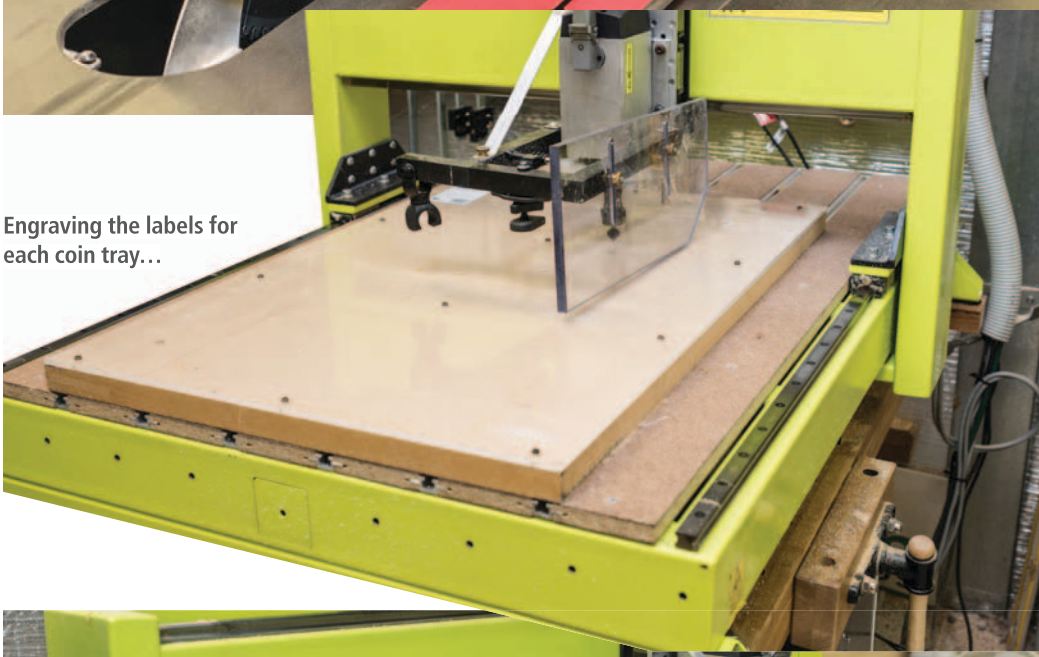
The coin trays are very simple—almost embarrassingly so. Things just don't need to be more complicated than they need to be (profound comment for the day).

CNC steps

Taking a sheet of 5 mm thick acrylic, it was secured to the bed of the CNC router. To ensure these securing points would not later be in the path of the router, I first determined where they should be on the computer model, then had those points transferred to the acrylic sheet with an engraving bit. The marks made guided where the screws were then inserted.

Labels such as "Australia Pre-Decimal", "Australia 20c Commemorative, etc, were then added to each of the trays using the engraving bit. (Yes, I started with the Australian section of my humble collection.)

After changing to a ¼-inch (6.35 mm) plastic milling bit (Amana Tool #51404 from toolstoday.com), a small hole was drilled in each coin location, 10 mm diameter. As I was setting each coin into a cavity that is close to the diameter of the coin, it would make it difficult to remove said coin without this hole, other than turning the entire tray over, spilling all the coins out. Unlike a drill press, a CNC router (or mill) is not restricted to just drilling holes that are the diameter



Engraving the labels for each coin tray…



… and making a lot of acrylic snow cutting the holes for each coin using the CNC.

of the available drill bits. It can drill holes from the diameter of the cutter up to the total bed size of the mill.

Next, a partial-depth cavity was routed for each coin. I cut these halfway into the acrylic, a 2.5 mm-depth cavity. Each was oversized by 0.5 mm, so the holes look to be the size of the coin, but not to the point that it is a tight fit.

That may not sound too difficult, but for all the trays needed for this storage unit, that comes to 2400 individual holes! One of the benefits of a CNC machine is it can perform some of these monotonous steps.

The final step was to cut out the individual trays, which was done with the same plastic cutting router bit. To ensure the trays stayed put while being cut, a few tabs were left around the perimeter. These were cut and sanded away after the machining had finished.

Traditional (non-CNC) steps

While you can certainly machine acrylic without a CNC, I used this as an opportunity to produce trays at the very budget end of the spectrum, cut from 6 mm MDF sheet.

The holes were the first things to cut. Working from the back of the sheet, 10 mm holes were drilled with a forstner bit. Care was taken as the bit approached



Using dominos to join the boards together for the sides and top of the storage unit.

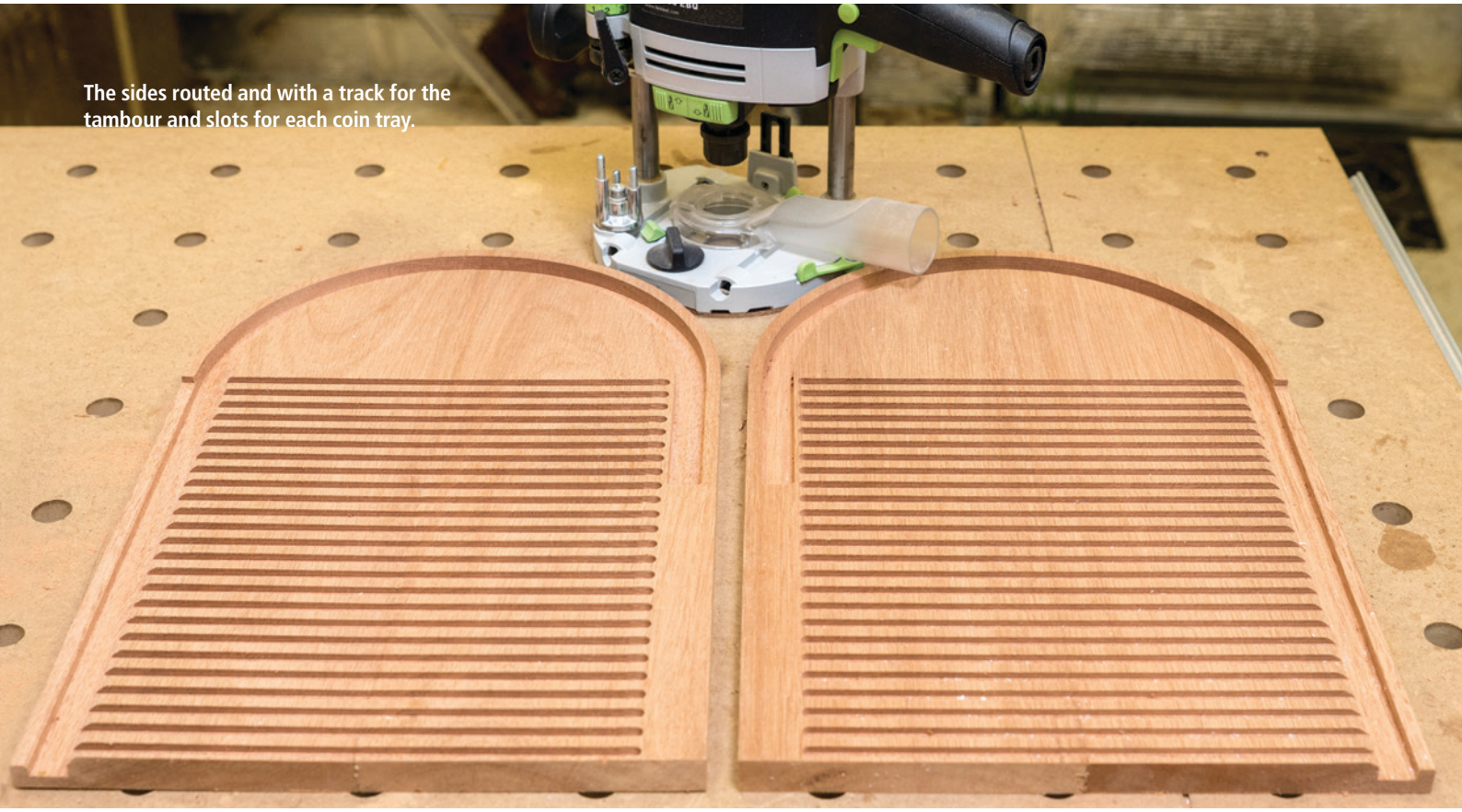


The completed coin trays ready to be cut out.



Kerfing the top of the storage unit so it can curve.

Bend it—the kerfed top of the cabinet.



The sides routed and with a track for the tambour and slots for each coin tray.

full depth, as I didn't want it to cut completely through—only far enough for the tip to just poke through.

This made a perfect hole to then use to line up the larger forstner bit to drill down 2.5 mm from the other side, making the cavity for the coin. Not allowing the forstner bit to punch right through the other side removes the risk of tearout.

The board was then taken over to the tablesaw to cut the outside dimensions of the tray, then the bandsaw was used to cut the indexing tabs. Finally, a pyrography pen was used to label



The two types of timber bending: kerfing (decorative) and tambour (mechanical).

> *The sides are the real hero of this unit, providing the overall form of the cabinet.*

each tray, and a circle of felt stuck into the bottom of each hole. It is up to you whether you choose to push the coins out through the felt, or create a small hole in the felt for that purpose.

If you did choose to use acrylic for the coin trays, a plastic cutting blade does an excellent job. I first tried a standard wood blade and got a really rough edge with some cracking and even some shattering. Next, I tried the Amana Tool LB10801C Non-Melt plastic cutting blade from toolstoday.com. Smooth edges, no splintering, chipping or shattering. With the right blade, acrylic is easily machined on standard woodworking equipment.

If you want to display bank notes, a couple of pieces of 3mm perspex makes a sandwich that the notes can be stored between, keeping them flat and protected, while you can still see both sides. These can be held together with small bolts and nuts in each corner, clamping the two sheets together.

Storage unit

The base, sides and top are made from 150 mm-wide timber, that I have then machined, glued and clamped to get the required width.

I started with boards that were around 20 mm thick. After planing on the jointer to get a straight side, and an edge perpendicular to that side, it was over to the thicknesser to get the second side parallel to the first. Starting with particularly straight timber meant I ended up with boards around 17 mm thick, which gave me plenty to work with.

The final edge was cut on the tablesaw to give boards that were properly dressed all round (DAR). These were docked to length (450 mm long for the sides, 400 mm long for the top and base). Using a Festool Domino (a biscuit joiner would have also been fine), the boards were joined to get a final width of 300 mm, with one being 400 mm wide for the curved top.

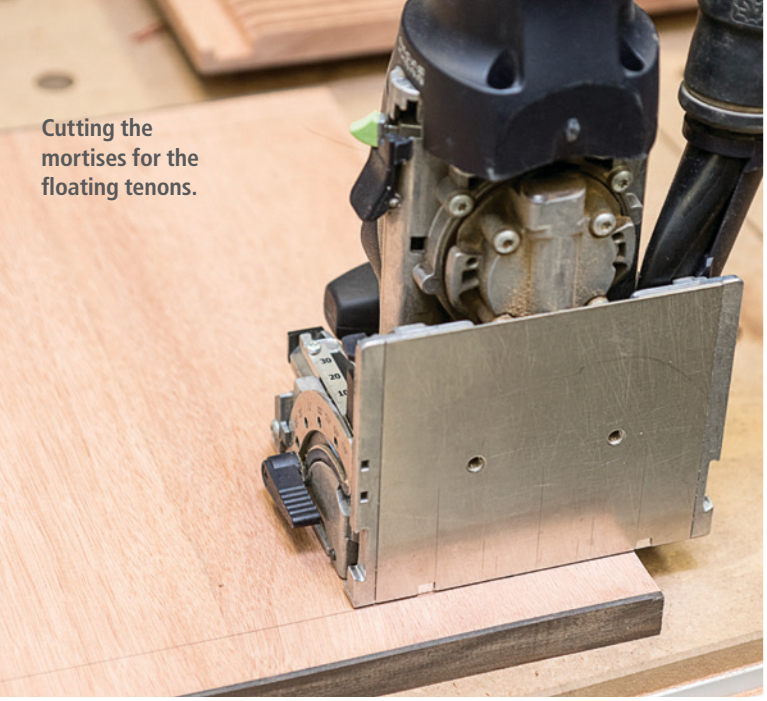
The sides are the real hero of this unit, providing the overall form of the cabinet, as well as providing the slots for the trays and the curved track required for the tambour door.

A router is the perfect tool for this job, using various home-made templates to create the required features, and MDF is a perfect template material. It is dimensionally stable, easy to machine and cheap.

First, the track for the door is cut, followed by the individual slots for the coin trays. Remember that the door slot is a mirror image for the left and right sides (flipping the template over). The slot ran up the full height at the front, but stopped partway down the rear of the unit, so the tambour door was limited in how far it could travel.

Rather than try to produce a template with all the individual slots for the trays, it is much easier to produce one as a fence, with a small tongue on the back that engages in the slot just cut. Rout a slot, index the fence up by one, rout the next slot, rinse and repeat.

Well that is how I've done it in the past. This time around, I used the CNC controlled router, so the templates were ones I designed on the computer. Same principle, just a slightly different method. This has really opened my eyes on how a CNC router can be integrated into various workshop functions, without taking over, dictating design, or even losing that



Cutting the mortises for the floating tenons.



One side of the cabinet attached with the dominos in position ready to attach the second side.

> *Do not bend it so the slots are on the outside of the curve. It will snap as quick as look at you.*

overall concept that I am woodworking and not just machining. There is nothing in this project that I did on the CNC that I haven't done previously by other techniques with the tablesaw, router table, bandsaw, or hand-held router (and templates).

The base was particularly simple, with a small strip of Queen Ebony attached on either side for a bit of subtle detail and the whole base oversized in length to create a bit of a lip detail.

Kerfing

The top was another story entirely. Over the years, the one post on my blog that has had more traffic than any other is where I explained how to make timber curve, using a technique called kerfing. There is even a manufacturing course in England that refers to my blog to explain the method.

Fundamentally, a thin piece of timber (such as a veneer) is very flexible, so by making cuts almost all the way through a piece of timber, leaving a section that is veneer-thin (about 1 mm thick), the timber will easily bend. Each cut is the width (ie, kerf) of the blade that is used and thus the name of the technique. A gap is left, then another slot cut. This is repeated over the whole surface, leaving a series of slots.

The material will then easily bend, but be careful—do not bend it so the slots are on the outside of the curve. It will snap as quick as look at you.

On the other hand, curve it with the slots on the inside and it will be quite happy. It will bend as far as you have allowed, based on the width of the kerf, the distance between each slot and how many you have cut. You can use this technique to make a large curved sheet, or even curve and bend a 2 x 4. While it is nowhere near as strong once it is kerfed, these slots close up at the edge as you bend the timber to the point that it will not curve any further with the slots fully closed. If you filled the kerfs with glue and supported it while the glue set, the timber will remain permanently curved. You can achieve any angle you want, up to and including a full 360 degrees.

One small thing to note however: this is very much a decorative technique, not a structural one. After all, you have taken a strong board and cut it almost all the way through, to the point it is almost ready to snap. You want it cut deep



Restraining the tambour in place so that the base can be attached leaving the tambour permanently captive.

The completed cabinet…





… with coins stored…

enough so it is ready to bend, not break and that takes a bit of trial and error. When dealing with a large sheet, cutting and manoeuvring what becomes a very flexible, weak structure is rather tricky. So a good method is to leave a border at either end of the slots and cut them away only when you are ready to fix it into position. It means you can cut all the slots without the board becoming floppier and floppier with each successive slot.

Tambour door

The tambour door is the final piece of the puzzle. Rather than repeat the steps here, have a look at the February/March 2015 issue of *The Shed* where I go right into the detail of making the tambour slats. In fact, this project is made from the leftover slats from the tambour sun lounge project. Waste not, want not.

Bringing the whole project together is made a lot easier with the Festool Domino. It may be an expensive tool, but it sure makes aligning pieces dead easy and the dominos themselves (otherwise known as a floating tenon) add a lot of strength to the joints.

Working out the order of assembly meant that I needed to bring the sides together so the tambour door was captive, before attaching the base. With the door in position, a clamp was used to hold the sides in position before the whole assembly was slid onto the base, where the dominos and glue was already waiting. Next (once the glue set), the top was glued into position and the back piece attached. Nothing more to do, other than a bit of a sand and apply an oil finish. Be rather careful sanding the kerf-bent top. It is really easy to be a bit too aggressive and sand right through the outer skin. Not that I did that—of course not, no chance…dang.

Nothing else left to do, except sort out the coins, find the appropriate location, and finally display the collection. The only danger is that now I can easily see where there are gaps in the collection and am tempted to go find/acquire the missing coins.



… and the doors closed.