Making a Stave Canister

Wood Selection

Size desired

Number of staves

Glueing

First turn

Bottom

Finish turn the can

Making the lid

Options

Wood Selection

Pick a 4/4 kiln dried board that doesn't have a twist that might look nice. Curly Cherry looks GREAT. Quartersawn White Oak looks GREAT. Curly Maple, Mahogany, Rainbow Poplar, Quartersawn Sycamore are all excellent choices. You could also select a more plane wood, Maple, Walnut, Oak, Cherry, Poplar, Beech, Birch. The size of the board or boards is also of concern. The least waste (and we are cheap enough that we don't want any waste) will be found in boards that are between 2" and 6" wide (or a multiple of those). The length should support cutting multiple staves. for me the board will often dictate the size of canister i will be making.

Size Desired

Often the size of the stave ring is part of the requirement. You can't make a 14"snare drum 13 1/2" across. The ring needs to be 14" across. You may wish to make a set of nesting canisters. The size between two canisters is set even if the size of a particular canister is not of a particular size. You may wish to make a set of graduated canisters. Or you may wish to make a canister of a particular size say for 5 pounds of flour or 3 pounds of coffee or 10 pounds of rice. There is some math involved in determining the size the canister will be. The basic rule is that the diameter of the canister is determined by the formula Pi * Diameter. That formula will give you the circumference of the canister. Divide that by the number of staves and you have a good indication of the width of the stave.

Number of Staves

The number of staves is directly related to the size. Staves should be between 2" and 6" wide. Narrower than 2" becomes fiddle and staves wider than 6" makes the walls thin. While the greater number of staves the wider the width of the stave can be. It is a math thing. But it is also an execution thing. I bevel the staves with router bits. The bit that are easily available are 45, 30, 22.5, 15 and 11.25 degrees. The 45 degree bit isn't of much use for making staves unless you are looking to make a 4" or smaller column. So we have 6, 8, 12 and 16 stave opportunities. You could use a table saw and cut any angle you like in which case you could make 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16...stave canisters. The problem with using a table saw to cut your bevels is accuracy. I know there are devices that can help setting angle of your tables blade very accurate. An 8 stave canister has 16 bevel cuts. If your bevel cut is off by 1/2 a degree that works out to 8 degrees. As you glue everything together the 1/2 degree will not be spread evenly but will instead end up in one or two places. So what size gap are we talking about? 1/8" The bottom line is that a router bit is going to yield more consistent and better results.

Glueing

I use West System epoxy, slow hardener. Yellow glue requires that clamping force drive the glue into the wood on either side of the joint. That is a LOT of force. That is more force than I can generate on all the stave joints at one time. Tightbond II achieves a LOT of it's strength by being slightly flexible. This flexibility ends up letting the joint to slip slightly from humidity changes. If you pick up a glued up turning and feel little edges it is because of this slip. Tightbond original dries hard with no slip. This puts the glue joints at risk. CA glue is brittle and wood movement can cause joint failure. Epoxy has a little flexibility without slip. The effect is that you won't feel any edges from humidity changes. Epoxy

doesn't require force to drive the glue into each side of the joints. The epoxy will seep into the wood on either side of the joints. I use filler to increase the strength of the joints. The process for glueing with epoxy is. Mix the resin and the hardener according to the manufactures specifications. For West System epoxy I use pumps that meter out the correct proportions. Mix the resin and hardener for 1 minute. I do this in a small plastic cup using an acid flux brush. "Wet" the surfaces to be joined. This means that the surfaces should look wet before you put the joint together. Some wood will need more than one coating of epoxy to achieve this "wetness". I then mix a filler with mixed epoxy and apply that mixture to one side of each joint. This will insure that any gaps are filled. I clamp the staves together using long hose clamps (sometimes I will connect more than one hose clamp together to get a large enough hose clamp). The goal it to insure that all the joints are closed and the staves are all in a good orientation. I will often tap the inside or outside of different staves to insure that everything looks good. During the dry fit I will measure the resultant diameter and make a waste wood disc attached to a faceplate of the desired size. I will glue this to the stave glue-up. The wetting of the end of the stave glue-up often requires 4 or more coats of epoxy as the end grain soaks up the epoxy. I put down a good bed of epoxy with filler on the disc to insure that the stave glue-up will be attached to the disc. I adjust the disc and stave glue-up to help insure the centered on the faceplate. I tend to clamp each stave to the disc. The epoxy is the only thing holding the stave glue-up to the lathe.

First turn

Once the epoxy has cured, because I use the slow hardener I let the epoxy cure at least overnight and sometimes I wait a day or more. There will be a little epoxy left in the small plastic cup with the acid brush. This should be firm when the epoxy has cured. The epoxy reaches 90% of it strength in 4 hours. I am looking for closer to 95% strength.

The first part of the turning is the most violent. I use a large (3/4") bowl gouge with good toolrest support to scrap the inside of the canister round. At first the scrapping is only hitting at one part of the rotation. I concentrate on the part closest to the opening of the canister. I also turn the opening surface true with a smaller bowl gouge or a large spindle gouge. I want to make a small rabbit on this opening which will be the bottom of the canister. The rabbit will provide more glue surface as well as some small mechanical connection. I make that round before moving into the canister. I do this about 1 inch at a time. I do the inside first because I want the support of the excess glue on the outside to make everything ridged. I adjust the toolrest into the canister in hopes of having less than an inch of overhang for the big bowl gouge. I am using this bowl gouge as a scrapper. I do not try to cut with this tool, just scrap. I generally move the gouge from inside towards the opening as this tends to exist the waste as I go. I try to progress as deep as I can. Once the inside is turned and before I sand I turn the outside of the canister. Again working from the open end toward the headstock. This time using a large roughing gouge at a fairly steep angle. Because I am cutting instead of scrapping this is a much less violent process. Once everything is turned smooth I sand as much as I can inside using 2" power sanding from 80 grit through 320 or more. I can't sand all the way to the headstock but I try to get close. Then the outside is sanded using a 3" disc power sanding from 80 grit through 320 grit or more.

Bottom

The bottom is turned and fitted to the canister. I want a good tight fit but knowing the nature of wood I don't expect to much. I like to cut a small glue well at the corned of the rabbit on the bottom. The bottom and canister are glued together using epoxy. remember that the end grain of the canister will soak up a lot of epoxy and may require several coats to be "wet". I again use filler with the last application of epoxy. I will generally use the lathe and tailstock to provide clamping force. If I take it off the lathe I will use at least 4 clamps and as many as the number of staves to hold it all together overnight. The only thing that will be holding the canister on the lathe is this glue joint.

Finish turn the can

The next day with the canister between centers and supported at the headstock and tailstock I will part off the top of the canister. No need to be in a hurry. Because I couldn't turn the inside of the canister all the way to the headstock the parting will be intermittent. Sometimes I will use a Japanese saw to finish parting the canister from the waste wood. Once the caniste remounted the headstock, only supported by the bottom of the canister, I finish turning the open end of the canister with the large bowl gouge as a scraper. Sanding with all the grits. I usually sand the inside at a fairly low speed as there is generally some blending to be done between the previous deep sanding and the sanding inside from the now open end top. I apply a couple coats of finish using minwax wipe on poly, oil base.

Making the lid

The lid should fit the canister but a suction fix is not advised. I like the top of the canister to have a slight bevel towards the inside. I like the lid to be level with a small rabbit fitted to the opening of the canister. You can make any knob for the the canister as big as you like.

Options

There are many options. One option I often use is adding thin (1/8" to 1/2" thick) contrasting wood between the staves. This is a good way to dial in the diameter of the canister. And the contrasting strips of wood look great. Every glue joint is going to show no matter what you do. So the contrasting strips celebrate the glue joint instead of trying to hide them. If care is taken in the glue-up you can have a wall thickness of as much as 5/8". Since a wall thickness of 1/4" is enough for structural integrity you have 3/8" of thickness of wood for design elements. Making the shape a barrel with the top and bottom smaller than the middle can give a nice look. The other way around with the middle pinched in gives a nice waste to the canister. Or you could form an outer surface of beads. Using staves from different color wood can have a pleasant effect. Make sure you use wood with contrasting colors and similar expansion characteristics. Yellowheart and purple heart show a nice contrast. As does maple and walnut.