Inlay Ornaments by Mel Turcanik

November 18th ZVW Meeting
"Inlay"

Mel Turcanik Presents

The above photo shows a background disc of birch inlayed with padauk (reddish brown), tagua nut (off-white) and solder (silver). The padauk is centered, the tagua is off center, and the silver is more or less randomly positioned. Mel first turned the paduak and tauga disks. Then he turned the birch disk with a centered recess. Careful sizing is the secret here. He used cyanoacrylate glue to secure the paduak to the birch, bored holes with a drill press for the solder, glued the solder in place, remounted the assembly, and turned it to its almost-final shape. Next he off-centered the turning and turned a recess for the tagua, glued it, and returned the assembly to its original center to finalize its shape.

Inlays are especially nice on box tops, but can enhance any turning, and can be done in many different ways. Below is an example of two ring inlays on a top that were done by Mel with green polymer clay pressed into ring recesses, baked in an oven, re-mounted, and turned to completion.

The above summary of my "inlay" demo written by Irv Miller, gives an outline of the inlay process. In this article I will go through it in a bit more detail and fill in some tips and tricks that were not

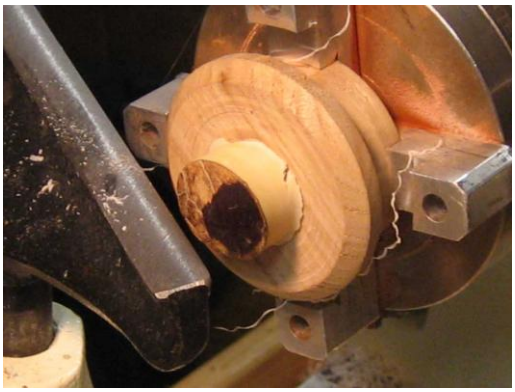
presented at the meeting. I really wasn't trying to make a finished product in the demo, just show some techniques. When I finished, I enjoyed the process and liked the result so much that I decided to make them into tree ornaments.

I started with birch discs that were about 1/4 - 3/8" thick and about 3 1/2 - 4 1/2" in diameter. The actual dimensions aren't that important. I just grabbed handy wood and used a bandsaw to make circles. The only thing that is critical about the disc preparation is that the back must be perfectly flat, smooth and dust free. That's because I'm using double sided turners tape to attach the disc to a faceplate on the lathe. Once I started making more of these, I realized that the easiest way is to complete the back side before even starting to do the inlay on the face. I believe that I sanded them to 280 or 320. No need to worry about the edges, they can be finished on the lathe as long as the finished disc is bigger than your faceplate. A waste block turned flat in a chuck or on a faceplate could also be used as a base to attach the background disc using tape.

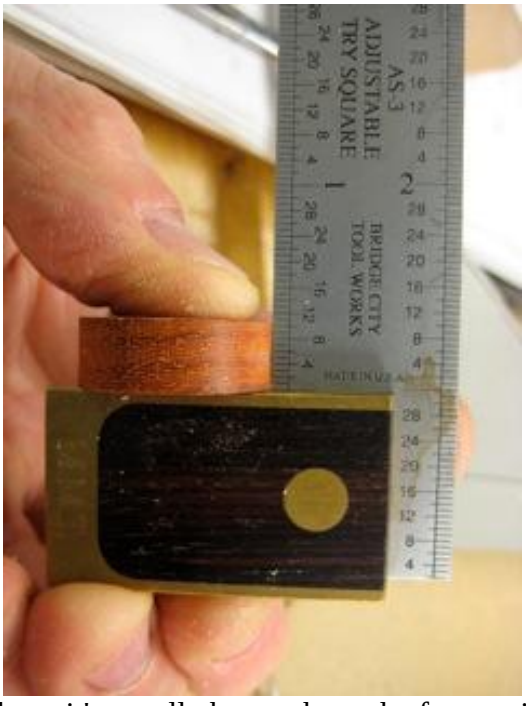
After you have some background discs prepared then you need to prepare the various inlay plugs. It's best to have all these parts prepared in advance, and have lots of extras, so that as you are doing the inlay process, you can pick and choose from different sizes and colors and not have your creativity limited by lack of selection. Preparation of the inlay plugs is critical. They should have a flat bottom and sides that are perfectly square to that bottom.

For very odd shaped bits, like this tagua nut, I use hot melt glue to attach it to a block that I can use to guide the nut into a sanding disc while riding on a miter gauge. This way the bottom is flat without a crown or any bevel and my fingers keep their skin.

Once that is done, it can be glued to a waste block, again using hot melt glue, in this case held by a chuck. The sides are then turned round and square to the bottom. To remove it from the waste block it's easy to cut through the hot melt with a bench chisel or get it cold in a freezer, or outside in a Minnesota winter then pop it off since the hot melt loses much of it grip when it's cold.



The way I check to see if the sides are square is to place a straight edge along the side while it's on the lathe and visually see if it lines up with the ways of the lathe. Once I take it off, I can check to be sure the sides are straight using a try square.



When using solid wood inlay plugs, it's usually best to have the face grain show. Most end grain is rather bland. However, this is up to your artistic judgment. Things like white oak can have dramatic rays shown in the end grain. In any case, keep in mind the grain orientation and how it affects the overall design.

If we have a pile of plugs and some background discs prepared, we are ready to do the turning and inlay. I used turner's double side tape to attach the background disc to a small faceplate so that the disc was off center. If you want to see where on the disc your inlay will end up, mount something in the tailstock the same diameter and bring it close to the mounted disc. In this way you can line up successive inlays and orient the elements to be aesthetically pleasing. When the alignment is correct the tailstock can be used for pressure to push the disc onto the taped faceplate.

I did these on a Jet mini lathe at about 1250 rpm. They are off center so be sure that they clear the tool

rest and ways and everything else before turning on the lathe. They are also only held on by tape and while I developed complete confidence in the ability of that tape to hold, I still would not want to take heavy cuts or use excessive speed. The first cuts are to smooth out an area on the disc slightly larger than the first plug you will inlay.

Next, set a divider so that the points are just a hair smaller than the diameter of the plug.

Now use the divider to mark the opening in the background disc. From your viewpoint with the tool rest parallel to the face of the disc, the left arm of the divider rests on the tool rest and is gently advanced into the disc while it turns. The right arm of the divider must never touch the moving disc or tool damage and serious injury is likely. It is only used to determine if the mark is the correct diameter. I start making marks nearer the center of the area that I just smoothed and move out (left) until the right arm of the divider is over the line being made by the left arm. Better to have a smaller circle than go too big.

Sorry for the blurry picture, my face shield was dusty and this is how it looked to me. It really doesn't matter if the smoothed area is recessed from the rest of the disc. This process will be repeated with each plug inlaid and the whole thing will be turned to the same level at the end. Now you are ready to clean out the area you have marked for the inlay of your plug. Start by making a scraping cut from the marked line at an angle that makes the hole tapered smaller as it goes deeper. I find a skew chisel resting flat on the tool rest works well for this.

The rest of the hole can then be cleaned out using a whatever tool you are comfortable with. You will want to end up with a flat bottom so that the entire plug can be glued, if possible. Be sure that you are inlaying deep enough so that when you do the final turning of the face surface, you won't go through your inlays. If the back is finished, then you only need about 1/8" between the bottom of an inlay and the back and you could push that to 1/16" if you are careful not to blow it out with pressure from the glue when inserting the inlay.

Once the hollowing process is done, you can trial fit the plug.

It doesn't have to be real tight, just snug. If it doesn't fit the opening of the hole, you know that you can take a little more off keeping that taper. Keep doing the trial and trim until the plug just fits the top of the opening. Take your time here. It's not uncommon to do several trials to get to the right diameter. With experience, you eyeball will get better and less trials will be necessary. But there will always be a few. At that point you can square up the sides and the plug will fit evenly all the way in. To get the sides square, use the skew as a scraper again, this time with the blade parallel to the ways of the lathe. If while trial fitting, you accidentally jam it in and can't get it out, try sticking it to something with the turners tape and using that to pull it back out. Hot melt glue might also enable you to attach a temporary handle. I happen to know the tape works because I managed to pull out a glued in inlay with that.... not on purpose.

If you are now confident that the plug will slide in nicely, you can glue it in. I find that works easier if I put the piece on the bench so that it sits flat and can drop the glue in and work it up the sides. If it squeezes out, that's OK. When turning the hole, you may want to make a groove in the bottom somewhere for excess glue to go. If you tap it in too hard and there is too much glue it could blow out the back if the background disc can't take the pressure. I'm using a medium thickness superglue. Ordinary white glue would work very well but would require more drying time.

At this point, you can take the disc off the faceplate. To remove the disc, I found that a bench chisel slid with the flat against the workpiece will wedge the piece off the tape. You want to do this at the end grain or you could break the wood. As long as you keep the chisel flat against the wood, it won't dig in and mar the finished back. Once the chisel is in a bit, you can lever a little and just wait for the tape to let go. Steady pressure will cause the grip to fail. It's not necessary to rush or force it.

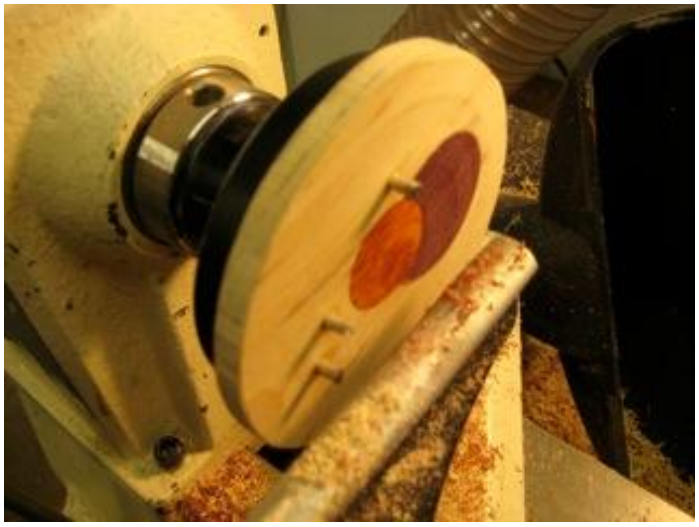
This process can be repeated as many times as you like on each disc.

One other thing I demonstrated was the inlay of silver wire. This I learned from Jimmy Clewes and I can highly recommend his instruction. He used a soft, non-tarnishing silver sourced from Rio Grande, a supplier to jewelers. I used lead free plumbers silver solder. It also is soft and doesn't tarnish, easier to get and less expensive. It's important to have a drill that works with the diameter of the silver wire. Do a trial hole and fit the wire into it. It should require light force, but not serious pounding. That will blow out the back of the workpiece. If you are going to add the silver wire inlays, remount the disc so that it's centered. The next turning will be the last. Once you have the right drill for the size wire you

have, just take the piece to the drill press and bore hole with the depth set to about 1/16 - 1/8" from the back, again assuming that the back is finish sanded. I used a handscrew clamp to hold the faceplate base so that I had a secure hold on the workpiece without having to unmount it or get my hands in the way of danger. The location of the wire inlays is another design consideration, and for this piece I find that an odd number with a progression like a Fibonacci
(http://mathworld.wolfram.com/FibonacciNumber.html)
looks really nice. Once you have the holes bored, set a depth gauge to that depth to measure the wire. I grab the wire at that point with a curved hemostat so that when I insert it almost all the way to that point I know I'm done. I round off the end of the wire that I'm inserting so it goes in easily.

The other end I cut after I've clamped it.

A couple drops of super glue in the hole and insert the wire and go to the next one. They really need to be as deep as possible and snug so that when you turn them off they don't get pulled out. Turning these spinning pins requires a slow, steady hand. Play with your lighting and background so that you can see the shadow of the rotating pins and it makes the process a bit less unnerving. Be sure the tool rest clears the pins before turning the lathe on! Take light cuts and try to do one pin at a time. I use a small spindle gouge to do this and the rest of the turning.



For the last turning the background disc is centered. Turn the front smooth and finish off the edge and sand the whole thing.

I apply the finish off the lathe using a clear spray, shellac or lacquer will work.

These are the results of my playing around. The "Cosmos Series" had its debut last December and will be in production by this summer.

Have fun developing your own designs. There are unlimited possibilities here and playing with the design is the most fun and rewarding part of this.

Photos by Irv Miller and Mel Turcanik were taken from several sessions with different workpieces.