

Summer 2015—Issue No. 21

The Journal

of the Guild of New Hampshire Woodworkers



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All About That Base

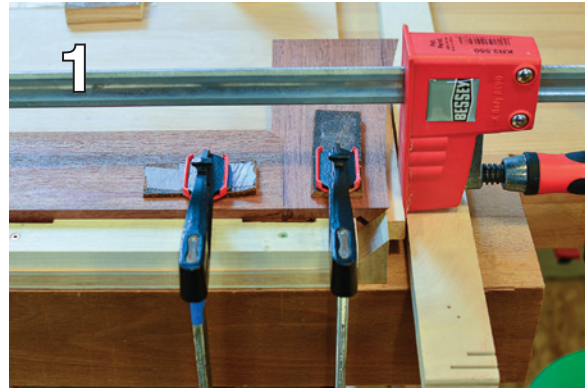
The first part of this article which appeared in the last issue of The Journal, began with a discussion of how I designed the base for a bookcase. Part 1 also touched on the use of templates, cutting the joinery and ended with a discussion of shaping the curved faces and edges. In the second part of the article, I will assemble and reinforce the base, make the beads and install them on the base.

Apron & Feet—On this base, the feet are joined to the aprons with slip tenons. When using slip tenons, I find it works best to glue them into one of the two pieces being joined before gluing the entire joint together. This buys me some time during the glue-up because I don't have to spread glue to half of the joint. Pre-gluing one half of the joint also prevents issues with having the slip tenon shift in the joint and possibly preventing the joint from being drawn together tightly. For the base, I glued the slip tenons with two-part epoxy into the ends of the aprons first. The slip tenons were milled from scrap pieces of bubinga. They were planed a hair thicker than the mortises. Each slip tenon was fit to its corresponding mortise with a hand plane followed by roughing with 100 grit sandpaper to provide a good surface for gluing.

To ensure that the apron/feet assemblies were glued-up flat, I used the clamping setup shown in Photos 1 & 2. This setup consisted of a piece of $\frac{3}{4}$ " plywood as a base (clamped to my bench), a fence against which the top edges/ends of aprons/feet could be registered, and a clamping caul with a 45° rip screwed to the right edge of the plywood base. The 45° rip on the caul matched the miter on the feet and allowed for clamping the whole assembly without damaging the miter on the foot. Photos 1 & 2 show the clamping setup during a dry-run. Before doing any actual gluing, I traced the curves on the legs and aprons with the template discussed in the first part of the article and sawed the waste away on the bandsaw (Photo 3).

When doing the first glue-up for each assembly, I used a scrap of bubinga that had been cut to fit over the slip tenon. This had been previously glued into the opposite end of the apron. This allowed for the use of a clamp while still protecting the end of the apron and the slip tenon. When doing the second glue-up for each assembly, I used a clamping caul with a 45° rip because the assembly now included both mitered feet and the apron. In Photos 1 & 2, the clamps that are arranged vertically, with leather pads between clamp and apron/foot are used to keep the assembly flat during glue-up.

Once all of the feet/apron assemblies were glued up, I secured them upright on the bench (Photo 4) and worked the top edge of each assembly with a handplane to ensure that the tops of the feet were flush to the top of the apron and that the top of each





The completed bookcase. The asymmetrical drawer arrangement served two purposes—to provide visual interest and to improve the functionality of the bookcase. The client very much appreciated the distinctiveness of the drawer arrangement. The bookcase is made of curly maple and bubinga, with Rosewood beads and drawer pulls. The back boards are spruce, which came from rectangular organ pipes from a church here in Pittsburgh, rumored to be over 100 years old. The finish is tung oil, shellac and wax.



Mike's reverence for all things wood was nurtured at an early age by his grandfather, a hobbyist woodworker and carpenter. Throughout high school, college and beyond, he explored wood as a building material through woodworking, studying Wood Products at Penn State, timber framing, carpentry and designing timber frames.

Mike and his future wife, Jen, moved to New Hampshire In 2005. While there, he discovered that furniture could be art, just as

much as painting, drawing or sculpture. This initial exposure to studio furniture helped him to discover his own sense of design, which had been latent until then, and was a catalyst for the type of finely detailed work he currently produces.

Mike, Jen, and Livvie the Newfoundland live on a small homestead outside of Pittsburgh, Pennsylvania, where they grow fruits, vegetables and keep honeybees.

assembly was flat. I didn't do much cleanup of the foot to apron joints other than that mentioned above because I wanted to wait until the entire base was assembled to clean up the outside faces of those joints.

A rabbet was milled to accept the Rosewood bead on the top outside edge of three of the four feet/apron assemblies installed later in the process. I did not rabbet the rear apron assembly, as there would be no bead at the back of the case. The rabbet was cut on the tablesaw with a dado blade. The assemblies were run with their inside faces against the fence and the top edge down on the table of the saw.

The next step was to mill rabbets to accept stiffeners to be inset into the base. The stiffeners served to stiffen the base (to prevent racking), reinforce the joinery and allow the base to be attached to the case. The rabbets were cut on the router table and ran completely through on the side assemblies but were stopped on the front/rear assemblies. More on the stiffeners later.

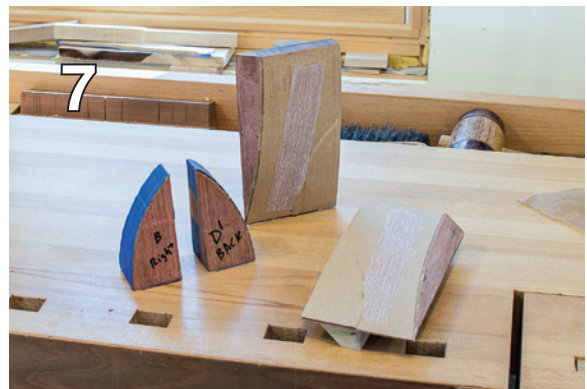
Assembly Order—I tend to put a fair amount of thought into the order of things before beginning any assembly and this base was no exception. The method I came up with was to fine-tune each miter joint individually (that is, to fine-tune the miters of two adjacent feet) with a block plane with the goal of a tight, gap-free joint.

Photo 5 shows how I worked the miters vertically on the bench with a block plane. Before gluing each joint, the spline was glued to one side of the miter joint with epoxy. This was done in succession, meaning I tuned one joint, glued the spline and then glued just that joint. Working one joint at a time allowed me to fine tune the miters as the base came together—an example of working with the reality of the piece instead of just assuming the miter angles would work out. Since the spline grooves in the feet were milled in a process that relied on consistent machine setup and consistent reference faces (discussed in part 1 of the article), the splines were extremely helpful later on during assembly because they very precisely located the two mitered feet relative to each other. They also prevented the two feet from shifting laterally during glue-up.

For the splines, I used quartersawn oak, milled from some thin leftover stock. The grain direction of the splines was perpendicular to the miter joint and each spline consisted of three individual pieces. A single full-width spline could have been used, but then I would have had to deal with gluing up and milling thin, wide stock—an unnecessary effort. Photo 6 shows a miter joint that has been fit and the spline already epoxied into the groove, ready for assembly.

Also in Photo 6, one of the clamping cauls is clamped to the foot. The cauls were offcuts from bandsawing the curves in the feet, so the cut face of the cauls matched the curve of the foot. To protect each foot during glue-up, I glued cardboard to the cauls and also stuck some 400 grit adhesive backed sandpaper to the cardboard to prevent slipping. To the same cauls, I also screwed and glued a block with a 45° rip. This allowed the joint to be clamped across the miter. Photo 7 shows the assortment of cauls used for each miter glue-up, all offcuts from previous processes.

In Photo 8, the fit of one miter joint is double checked prior



to glue-up. Not all cauls are in place yet, but this photo provides a good illustration of how the different shaped cauls were used. The wax paper on top of the bench is there to protect the bench from adhesive squeeze-out.

Photo 9 shows one joint during gluing. Lots of clamps, but they all serve a purpose. One thing I've learned about glue-ups is that nothing should be left to chance and it is absolutely worth the time and effort to make everything you may need (cauls, jigs, etc.) to allow for complete control over a glue-up. And do a dry run, or three, so you can work out all the issues and know how it will go together.

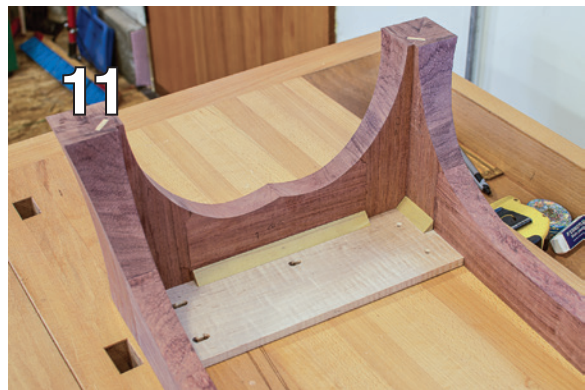
With the base assembled, the stiffeners were installed prior to doing any cleanup of the joints. I made them out of leftover maple stock. I glued and nailed the stiffeners to the base sides and also to the first 2" or so of the front and back apron assemblies. To allow the stiffeners to expand/contract in the rabbets milled in the front and back aprons, they were attached to the aprons a few inches in from their inside edges with a screw in a slotted hole (Photo 10). As mentioned earlier, the stiffeners also provided for attachment of the base to the case.

Photo 11 shows the underside of one stiffener, with the screw holes visible. The holes at the front of the case are not slotted, as I wanted the case to be "fixed" at the front to maintain the reveal of the bead relative to the case front. The slotted screw holes become more elongated as you move toward the back of the case since the most movement will occur at the back. This photo also shows the glue blocks used to help attach the stiffeners to the base—a "belts and suspenders" approach.

The base was also reinforced with a rail that ran from front apron to back apron at the midpoint of the base. This rail was attached to the front and back aprons with dovetail joints (cut by hand, after assembly of the base), and also had screw holes with the same extent of elongation as the stiffeners to allow for attachment of the base to the case. This rail is just visible in Photo 16, at the back of the base.

With the stiffeners installed, I moved to the cleanup of all joints. As mentioned previously, I didn't do any fairing of the outside (visible) face of the foot-to-apron joints after they were assembled. I held the base vertically in my vise and faired the joints on the outside faces of the base, including the miters, with scrapers and spokeshaves (Photo 12). I also cleaned up the rabbets milled earlier in the sides and front with a rabbet plane.

Rosewood Beads—The last step to complete the base was to add the decorative Rosewood beads. But before that could be done, there were some details that needed to be addressed. First, the top corner created by the rabbet on the sides and front received a roundover to provide a transition into the bead. In Photo 13, you can see that I've laid out the extent of the roundover in pencil, and have begun to shape the right side in the photo (which is the front of the case). Shaping was done with a blockplane and files, and cleaned up with sandpaper. I also shaped a facet in the bottom of the feet (Photo 14). This was done for two reasons—to provide an interesting visual detail and to protect the bottoms of the feet, which had fairly delicate end grain.



I used East Indian Rosewood for the beads (Photo 15). The bead profile was cut into a larger blank with a scratchstock and then the actual beads were “freed” from the stock with the bandsaw. I’ve scratched beads both ways—mill the material to final size first or mill to final size after scratching the bead. Both ways work. I chose the latter as the bead stock that I had on hand was of a size that was conducive to scratching first, meaning it could be milled down further with minimal waste. If you are scratching a bead in larger stock, as I did, you’ll appreciate the fact that holding the material while scratching the bead is much easier. After freeing the beads, I planed them to thickness with a block plane and smoothing plane, and then cleaned up the bead profile with sandpaper.

Installing the beads was an exercise in precise handwork and controlled glue-ups. I started on the front right corner with two pieces of mitered bead stock. In Photo 16 you can see that the side bead is held in place with blue tape. This allowed me to fit and install the front bead (the front bead was two pieces as the stock wasn’t long enough for a single piece), while maintaining the relationship to the side bead. Once fit, the beads were held in place with a small amount of glue (very little, because squeeze-out under a bead is a pain to remove), some predrilled brads and clamps. I used blocks under the clamp heads to direct pressure to the bead and protected the bottoms of the aprons with leather pads.

Once the first bead was in place, it was just a matter of working around the case, carefully cutting/fitting each piece and securing it in place. To cut the miters, I first cut them a hair long with a handsaw and fine-tuned the joints with a block plane on a shooting board.

While there are no images to illustrate how I handled the back of the base (my apologies), I’ll try to describe it in writing. I didn’t use a bead at the back of the case because it would not be seen. However, if someone looked at the side of the piece I wanted it to appear as if the bead simply mitered around the rear corners and continued out back. To achieve this, I shaped the back ends of the side beads with a bead profile using files and sandpaper. With Rosewood, the end grain is nearly indistinguishable from the edge grain in terms of color, so this solution worked fine (and more importantly, looked fine).

Last Thoughts—One last thought before wrapping up this article, which has to do with the rabbet milled into the sides and front of the base. I opted to mill the rabbet into the base on this piece. I’ve also made a similar base in the past where the rabbet was milled into the bottom of the case (and the bead sat on top of the base). I prefer the method shown here because the rabbet helps to locate the bead when attaching. Since the bead is set into the rabbet, it can’t shift backward, which makes the whole gluing/nailing/clamping process a more controlled one.

My early days of furniture making included some disappointing glue-ups (the kind that are better to forget about rather than dwell on). Since then I’ve learned that having control during assembly is so important in creating precise, well-fit work. After all, isn’t that what makes this kind of work so rewarding? ■

