Gleanings from Townsend Dovetail Joinery

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The dovetailing of drawers and cases, the most fundamental and essential joint in the cabinetmaker's repertoire, has long been a subject of some mystery and intrigue. A long-debated point among cabinetmakers has been whether pins or tails were cut first, and if one way or the other is period method. The second point is how period dovetail joints were made in such quantity and with enough precision and snugness to last through centuries of use. While we can't watch the original makers at work, there are enough clues in their work to reveal their methods.

Pins or tail first?

The two parts of a dovetail joint are the tail, the tapered part on the drawer side, and the pin, the smaller triangular part showing as end grain on the drawer front or back. (figure 1) The question that arises is whether period cabinetmakers made the tail part of a joint and then used it to scribe the pin, or if they cut the pins and then used them to scribe the tails. There is no right or wrong way to make dovetail joints, and modern cabinetmakers have their own favorite method. It is, however, easier to scribe the pins from the tails because marking the tails from the pins requires scribing them from inside the joint, and that can mean working in tight quarters on a small drawer. (figure 2)

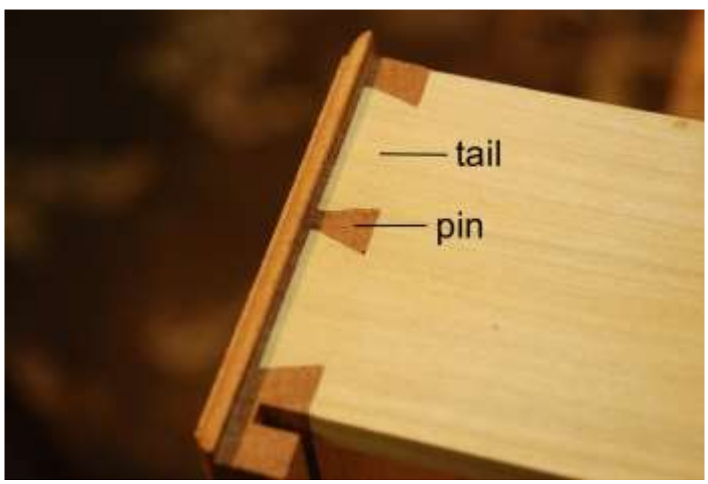

Figure 1. Identifying the tail and the pin in a dovetail joint.

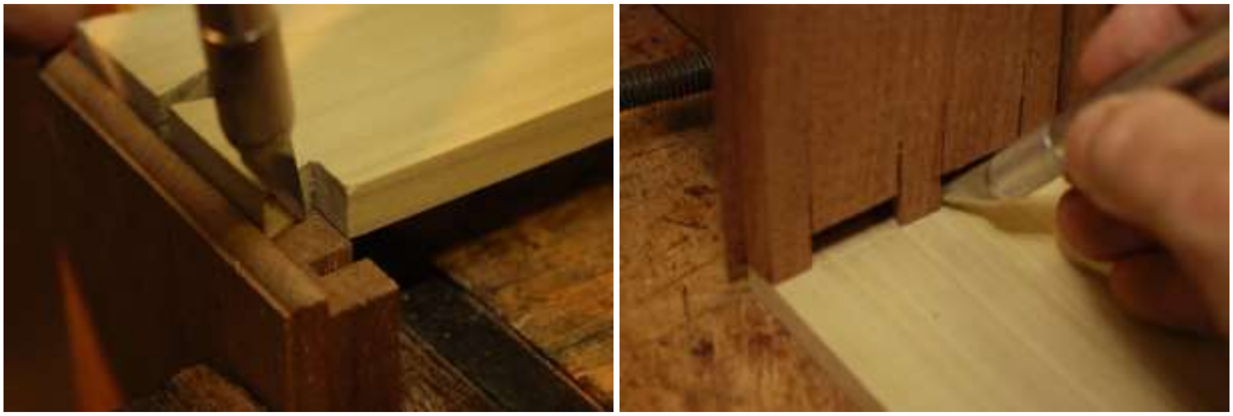

Figure 2. Scribing pins from tails (left) and tails from pins (right). While there is no correct method, scribing the pins from the tails is far easier to align, see, and mark. Scribing tails from existing pins is somewhat more difficult to do and means working in tight quarters.

There is no written record of how period cabinetmakers did the task, but a very close look at their work should offer some clues. Towards that end I've looked carefully at scores of period drawers and most of them give no evidence one way or the other. One would expect a few visible scribe lines to reveal the makers' method, but there are usually none that offer definitive answers.

It is not uncommon to see pieces in which the drawer sides extend slightly beyond the back of the drawer and this in itself offers some insight. One of these is a chest of drawers dating from the second quarter of the 18th century and thought to be from the shop of Job Townsend Sr.

In his method of dovetailing he clearly began with the drawer sides, the tails, first. (figure 3) The drawer sides and back are 3/8" thick. With the component parts made and cut to size, he scribed lines parallel to both ends to mark the length of the tails, in this case he chose 7/16"-long tails for the important front dovetails. He then marked out and cut the tails with the same layout on both ends, making the front and rear of the drawer sides more or less interchangeable. Next he scribed lines on the surface of the drawer front and back equal to the thickness of the side (3/8") to mark the depth of the pins. Using the drawer side as a template, he scribed the location of the pins on the drawer front and back, sawed on either side of the pins, and chiseled away the material between. The front dovetail joint, being half-blind and scribed from the tails, fits perfectly, but in the back, the 7/16" long tails extend beyond the 3/8" thick back. (figure 4) This fairly common feature in drawers of 18th-century pieces and would only come about if the drawer sides, the tails, were made first without regard to the thickness of the back.

Figure 3. Drawer side from a Townsend chest showing the drawer side tail layout of two tails at each end. The front is at the right and the rear is at left. The sides and back are 3/8" thick and the tails are 7/16" long, resulting in some overhang at the back.

Figure 4. Close-up of the back of drawers of Townsend shop chest showing sides extending past the drawer backs. The sides were first scribed and cut for 7/16" long tails and therefore extend 1/16" beyond the 3/8" thick backs.

Another example is from an 18th-century Newport desk by an unidentified maker. (figure 5) In this maker's work, there are large and lengthy scribe lines inside the drawer sides that mark the dovetails. At first glance it looks as if the pins of the front and back were positioned over the sides and these lines were scribed from the pins. On closer examination, the lines are far too thick to be accurate scribe lines for cutting fine dovetails; they are as wide as a dull pencil line. Joinery was laid out with carefully scribed lines produced by a knife edge, so these thick markings can only be the initial layout of the tails, which the maker didn't follow too carefully. Once those tails were cut, the pins were scribed from the tails and the parts were assembled with these marks on the inside. Another example of tails having been cut first.

Figure 5. Interior of a desk drawer by an unknown Newport maker. Thick scribe lines inside the drawer lay out the tail positions which were then cut somewhat inaccurately. The pins were then scribed from the cut tails.

Creating a Tight Joint

Strength and longevity in a dovetail joint lie in creating a joint that is tight – tight enough to require a block and mallet or clamp to put together fully. To achieve this there needs to be an "interference fit" where some parts are slightly larger than their corresponding parts. An interference fit requires some force to assemble the joint and therefore some force to take it apart. While period cabinetmakers did use glue in their dovetail joints, the strength of the joint lies in the interference fit of the parts. The glue merely keeps the parts in position.

Scribing one part from another makes for a good line-to-line fit, but that is not actually tight. On the other hand, a little interference fit makes for a tight joint, but too much of it risks damaging delicate dovetails when they are assembled. This is especially true at the outer corners of the tail, where the grain of the wood runs across the acute point of the tail, making it very delicate and prone to breakage. Therefore it's important to build in some interference fit at the base of the tail but not at the outer corners.

For a good example of how this was done we can turn again to the masters, in this case a drawer from a high chest by Christopher Townsend in a private collection. A close examination of the pins and tails show the wood fibers at the base of the tails compressed slightly upon assembly with the pins, indicating that he did create an interference fit in that area. How this fit was achieved is not readily apparent and not visible on the assembled joint; the secret lies in the internal parts of the joint. Townsend tapering the sides of the dovetail slightly, making them slightly narrower on the inside of the joint at the base of the tail.

Disassembling a Christopher Townsend drawer was not an option, but a twist in the drawer front had loosened the joints enough to discover this. The joint had opened enough to slip a strip of paper behind the pin and find the tapered inner face of the tail (figure 6). In every space where the the inner faces of the tails were accessible, they were tapered slightly, perhaps 3 to 5 degrees.

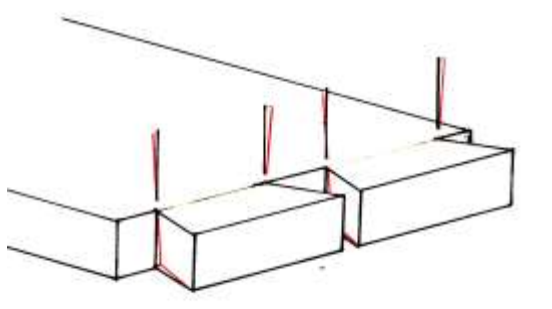

Figure 6. Drawer by Christopher Townsend (1701-1785) with paper strips showing the taper cut on the faces of the tail to ensure a tight joint upon assembly. Below is a drawing showing how that slight taper (in red) is cut on the inner faces after the tails have been cut. There is no taper at the delicate outer tip of the tail so there is no interference and therefore no breakage.

Because of this taper, when the pins are scribed from the tails, the resulting pins are slightly wider at their widest point than they would be without it, creating the interference fit. Upon assembly, the joint fits easily together at first but becomes tighter as the tail is pressed into place. The tightest part of the joint is at the base of the tail, inboard from the delicate tips of the tail. This can also be verified by looking at the one of the back dovetail joints, where the end grain of the tail is visible. The tip of the tail is visible and vertical, but the inner surface of the tail face shows the slight taper. (figure 7) This taper also has the added benefit of not scraping the glue off the sides of the pins as it is assembled as it would if the tails had a straight, untapered interference fit.

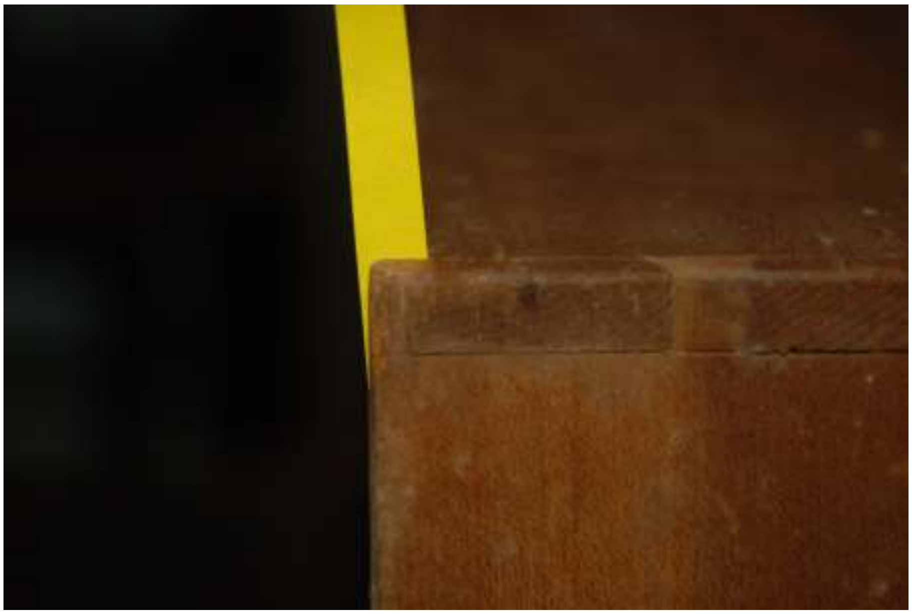

Figure 7. Rear dovetail of the Christopher Townsend drawer showing the tail is tapered at the base of the inner face while the tip of the tail is straight and untapered.

We see these slightly tapered dovetails on other parts, such as drawer dividers, where the taper makes for easy assembly and only the last fraction of an inch of assembly requires the force to create a tight fit. It only makes sense that the same method would be applied on a much smaller scale to make drawers that remain tight and secure for perpetuity.

Figures 8 through 10 show the steps in recreating the Townsend method of making exceptionally tight dovetail joints. The amount of material removed from the tail face is very slight, just a thin shaving, since the effect of many tapered pins adds up to make a very tight joint. A drawer dovetailed this way is tight enough to remain firmly rigid without glue. All period dovetail joinery did use glue, sparingly, to keep the joint assembled. The joint provided the strength, the glue maintained the joinery.

Figure 8. Tails are first laid out and cut (left), then the drawer side is turned over and slight tapers are cut on the inner faces of the tails (right). Note there is no taper at the tip of the tail and it increases toward the base of the tail. This taper is very slight, removing only about 1/64” on each tail face since the effect is additive with each tail.

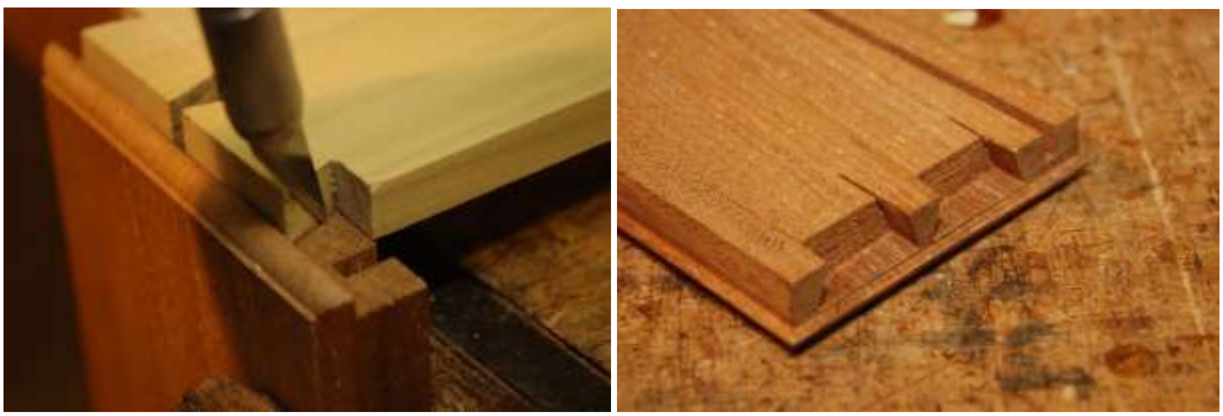

Figure 9. The pins are then scribed on the drawer front from the now-tapered tails (left) and the material between is sawn and chiseled away (right).

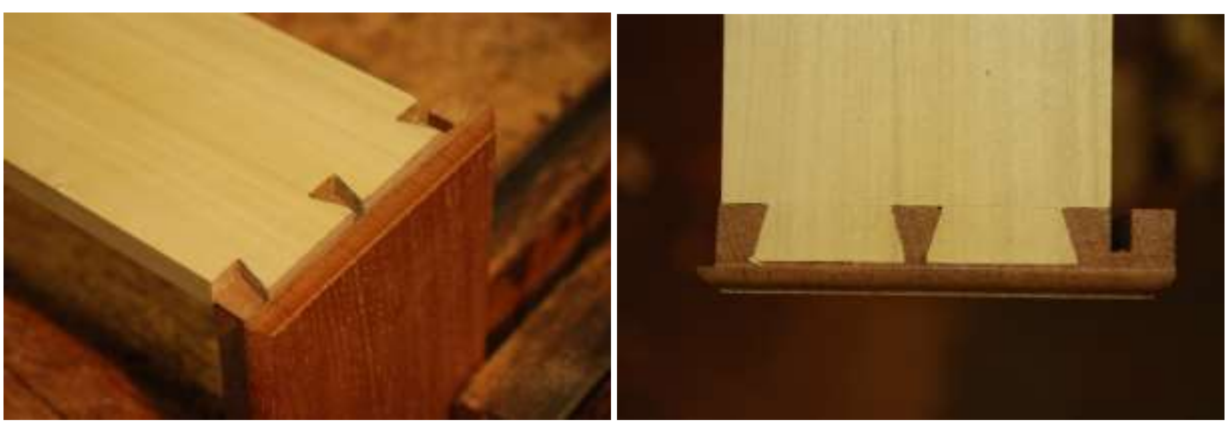

Figure 10. The joint now assembles easily by hand (left), but needs a block and mallet to be assembled fully (right). The resulting joint is very tight at the base of the tails with no damage to the delicate tips of the pins.