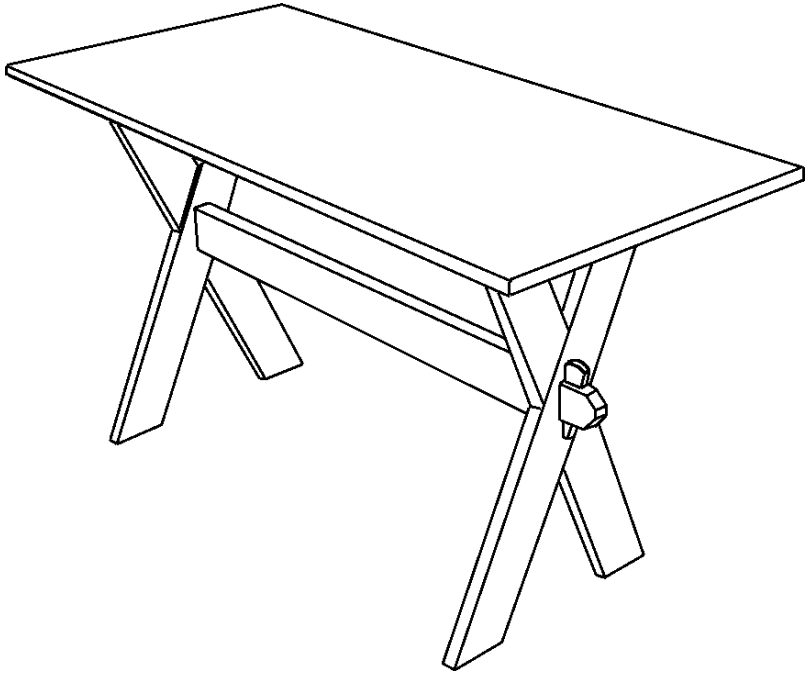
Making a Tusk Tenon for Knockdown Furniture

By Thomas Rettie

In the Middle Ages, like today, people sometimes needed portable furniture. While we tend to think of medieval furniture as usually large, massive, and immobile, there were many instances when furniture needed to be broken down and moved from place to place. In the home, space was at a premium and bulky items such as tables were put up when not in use. In the workshop, a table might be moved to where the light was best, or taken to market for use as a counter. Even in death, prized furniture might be sent with the deceased to the afterlife, as with the Viking burial ship uncovered at Oseberg.



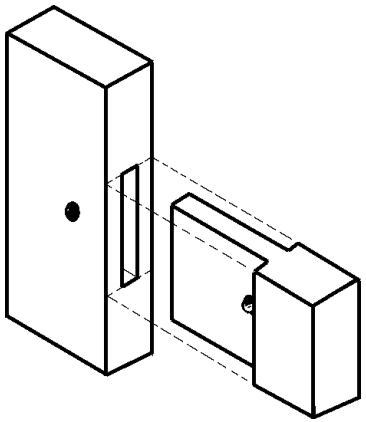
A 16th Century German work table with tusk tenon joints (after examples in Jost Amman's "Book of Trades").

The problem in making portable furniture is in devising joints that are strong when put together, but that are easily taken apart and reassembled. Today we have a profusion of temporary metal and plastic fasteners, but in a time when nuts and bolts had to be forged and cut by hand, economical solutions were more limited.

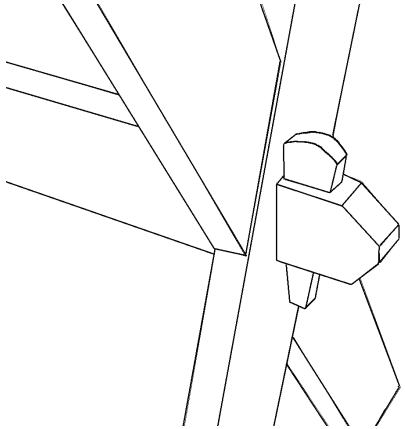
One solution is the tusk tenon. Also called a *keyed tenon* or *wedged tenon*, the tusk tenon is a kind of mortise and tenon joint that uses a wedge-shaped key to hold the joint together.

In a common mortise and tenon joint, a protrusion on one part (the tenon) fits into a hole on the other part (the mortise). Usually the joint is then locked with a peg using a technique called *drawboring*. In drawboring, the holes for the peg are slightly offset so that the peg will pull the joint tighter when it is driven in. As the wood expands and contracts over time, the peg can be driven further to keep the joint tight. The peg can also be driven out, allowing the joint to be disassembled if necessary.

With a tusk tenon, a key is used instead of a peg to hold the joint together. Not only is the key easier to remove and replace, it also provides added strength and stability to the joint. Because the key is outside the joint, tusk tenons can only be used with through-tenons (that is, joints where the tenon goes all the way through and out the other side of the mortise).



Pegged mortise and tenon joint.



Tusk tenon joint.

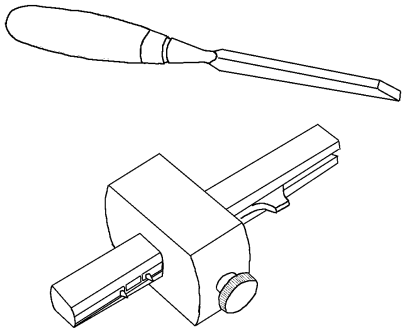
The use of tusk tenons dates back to at least the Vikings, whose mobile society made knockdown furniture a practical necessity. While not widely adopted in English joinery, keyed tenons are seen frequently on German furniture, particularly on boarded benches, work tables, and counters. They are also evident in heavier framed construction, such as printing presses, looms, and post-and-beam buildings. Tusk tenons even made a brief comeback in the Arts and Crafts movement of the late 19th and early 20th centuries.

Skills, Tools, and Materials

Tusk tenons require no particular skills beyond the ability to cut a mortise and tenon. If you have not attempted one before, you will want to try a few for practice before forging ahead with tables, benches, and the like. Most basic woodworking books will provide instruction on mortise and tenon joinery; in short though, you will need to be able to cut a straight line and make a square hole. When you are confident with mortise and tenon joints in general, you should have no problem in making a tusk tenon joint.

As in all woodworking, there are many choices in the tools you can use to make a tusk tenon. If you are using hand tools, you will need, at a minimum: a saw and a well-honed mortising chisel. A marking/mortising gauge is also helpful in laying out the cuts, and a brace and bit can speed things up when removing wood from the mortises.

If you have access to power tools, a drill press or mortising machine can speed things along, but you will still need a chisel to cut the sloping side of the mortise for the key.



Mortising chisel and mortising gauge.

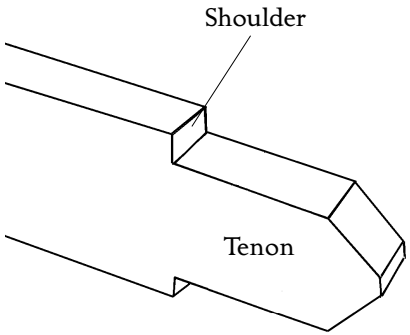
For a strong joint (and less cursing when you cut the mortises), you will want wood with clear, straight grain and no obvious cracks or knots. In general, hardwoods such as oak and poplar are excellent, but I've also had good results with softwoods such as pine, fir, and hemlock if they have a clear grain.

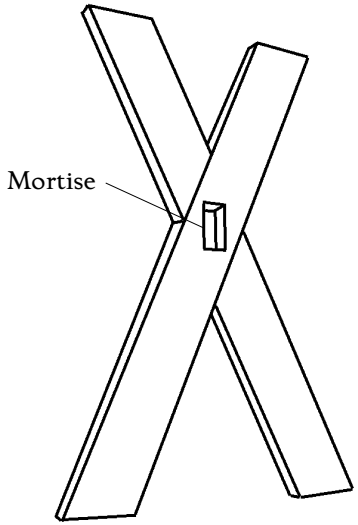
Making a Mortise and Tenon Joint

Begin by making the mortise and tenon joint. The particulars of this joint will of course depend on the piece of furniture you are making; the examples shown below are for the trestle table shown on page 17.

I normally begin by making the tenon (others may start with the mortise). The distance from the shoulder to the end should be long enough to pass through the mortise with at least 4 or 5 inches to spare on the outside. You can always cut it down later if you find it too long; it's much harder to add wood back if it's too short.

When making a through-mortise, it is a good idea to cut in from either side to avoid tearing or splintering. A useful rule of thumb is never to cut a mortise that is more than one-third the width of the stock you are working with.

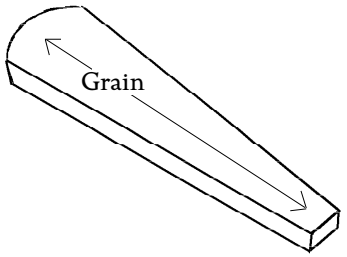




Making the Tenon Key

I find it convenient to next make the tenon key. The key should be no more than one-third the thickness of the tenon it will pass through. Ideally it should be just slightly thinner than the thickness of your mortising chisel. If the key is too thick, it may split the cheeks of the tenon.

The key is wedge shaped; straight on the inside edge and tapering on the outside, with the grain running the length of the key. The top of the key can be flat or rounded (round will be less prone to splitting). In general, the longer the key, the more stable the joint will be.

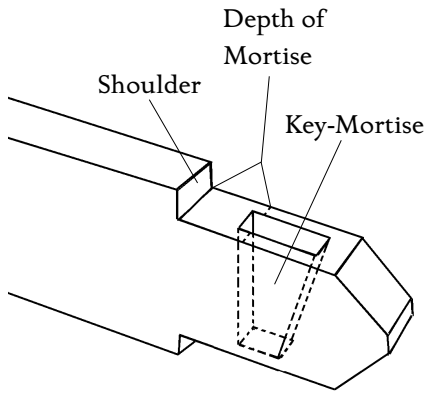


Tenon Key

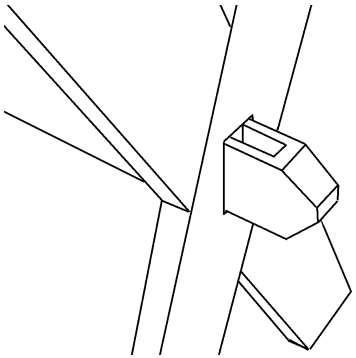
Key-Mortising the Tenon

The mortise that will hold the key must have approximately the same wedge-shaped profile as the key. Hold the key against the side of the tenon and trace its profile, then carry the lines across to mark the outline of the key-mortise on top and bottom.

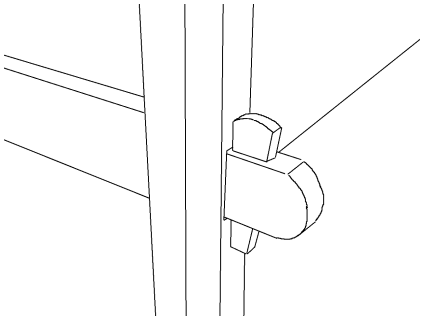
The key-mortise should be placed slightly closer to the shoulder of the tenon than the depth of the mortise, so that the key will pull the shoulder towards it when it is driven in.



Tenon with Key-Mortise



Assembled Joint

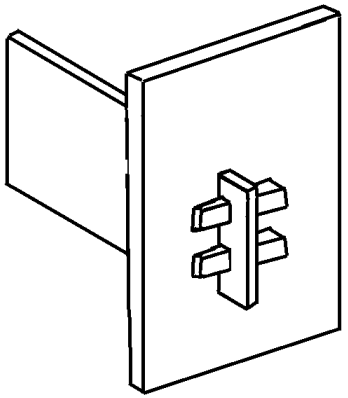


Tusk Tenon Used with a Bed Rail

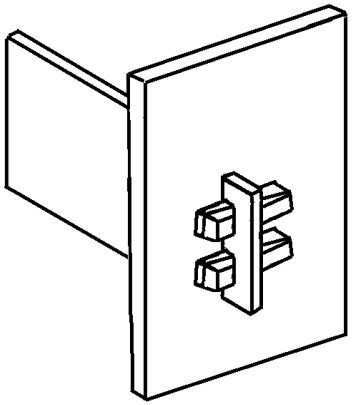
Variations

There are variations of the tusk tenon that can be used when the tenon is too thin to accommodate a vertical key. Instead, pegs or horizontal wedges can be used, although this is usually a less secure configuration.

If using horizontal wedges, use two key-mortises per joint to prevent "racking" (that is, where the joint is no longer perpendicular). Either taper the key mortises to match the wedges, or use two wedges (one from either side) per mortise.



Joint with One Wedge per Key-mortise



Joint with Two Wedges per Key-mortise