

# Turning Threaded Inserts

by Ed Glenn

Most 2-part game calls, like a duck or goose call, fit together with some sort of friction fit. Typically, the stopper, which holds the toneboard, reed and wedge (the guts), is held inside the barrel by friction. The stopper and barrel may be turned to an identical taper, perhaps only the stopper is tapered or the friction may come from one or more rubber-like O-rings. Nearly every design poses the potential of either too little friction or too much. Too little and the stopper may be lost in the field. Too much and the pressure may “lock” the stopper in the barrel or worse cause the barrel to crack.

Some call makers have devised various ways to replace the friction fit with threads, giving a more secure joiner to the two parts without creating considerable external and internal stress. A brass insert, intended for furniture construction, might be used.

This article describes a wood insert for both the male and female threads, cut from segmented hardwood and threaded with a shop built fixture.

## Building the segmented insert.

Most wood game calls are turned with the wood grain parallel to the turning axis. Threads cut directly into the barrel or stopper would be cut cross grain and the sharp edges of the threads would be subject to splitting, perhaps to the extent that the entire joint would fail. Threads cut with the grain are much less prone to split out. The only way to assure that the grain of the wood runs around the circumference is to build up a segmented section with the long grain of the lumber running perpendicular to the outside of each segment.

In this example, an 8-segment section, 2.5” long was used. Both the male and female thread elements are



This matched set of wedge pattern calls sports threaded inserts between the barrels and stoppers, replacing the traditional friction fit between the two.



Chopping the segments cross grain will mean the threads will be cut running with the grain all around the assembled segment. Note the tiny flat left on the inside of each segment.

.75” long, thus the 2.5” length is adequate for both, or more efficiently for two of each. A 12” length of stock, S2S 13/16”, was first jointed along the base edge then ripped to 2.5.” Eight segments required a chop angle of 22.5° ( $360^\circ / 8 = 45^\circ / 2 = 22.5^\circ$ ). I use a radial arm saw, but a chop saw will work equally well. It’s very important that both the saw and the fence be tuned square with each other and with the table. I use an auxiliary fence and table that can be replaced as repeated different angle of cut chew up the fence and table.

Once the correct angle is determined, which may take some fine adjustment and some trial and error, mark the stock along one edge so you can orient the segments with the original edge of each on the same end of the segmented blank. It will fit together better that way.

Chopping segments is tedious work. There may be

several hundred in a segmented game call. I usually chop only enough for one segment and then shift to gluing up at least part of that segment.

I use Elmer's ProBond, a yellow carpenter's glue



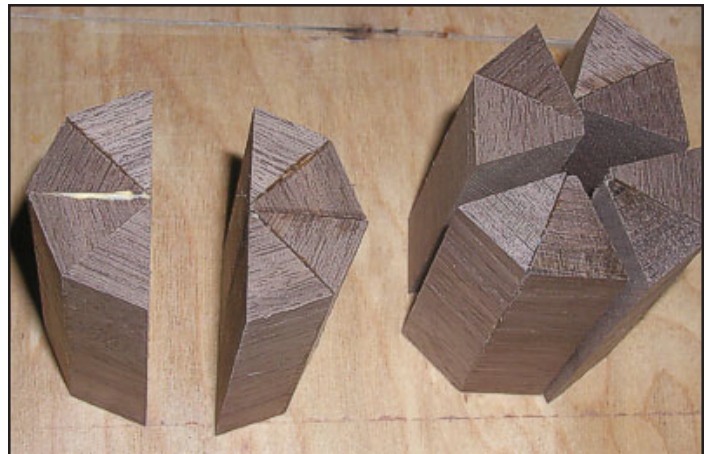
When gluing parts like this, rub the parts together to spread the glue over the entire joint.



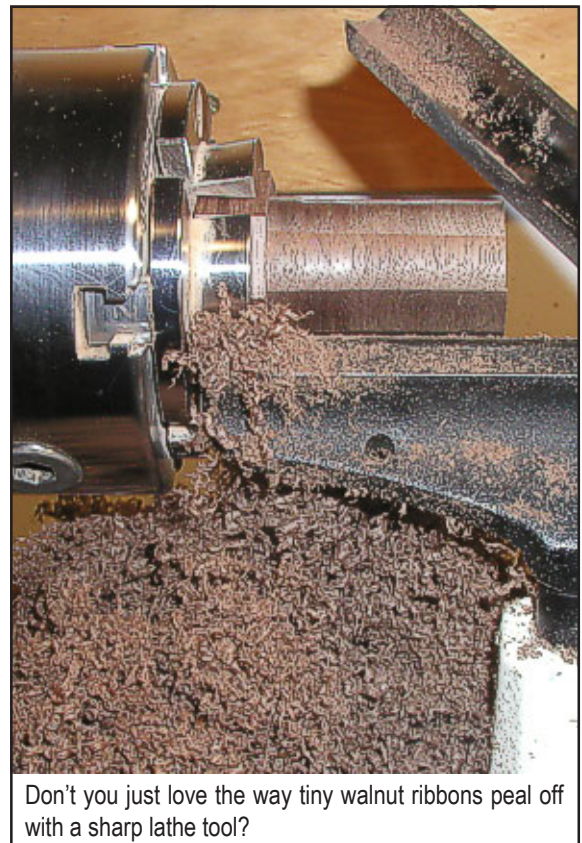
Rub the parts back and forth with increasing pressure to achieve a uniform squeeze-out. The glue will eventually squeeze out until you get a "tack." Hold the pieces a few more seconds and then you can set the pair aside to cure.

with weatherproof qualities. Better yet, it has a fairly quick "tack" and cures to workable strength in a few hours. Certainly overnight doesn't hurt, but I have glued up threaded insert blanks and then turned and finished them the same afternoon.

Make up two sets of blanks while you're at it, each will make two inserts, either a couple of males or two females.



I glue two segments together to make a quarter circle, then glue to quarters together to make a half. Check the fit before gluing the halves together, you may have to sand them to fit perfectly.



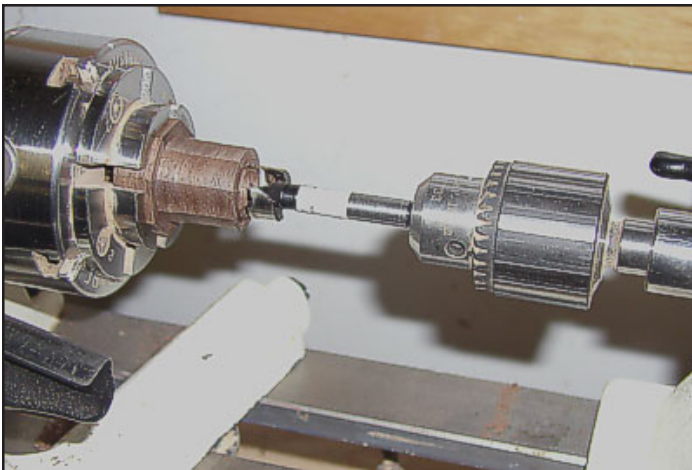
Don't you just love the way tiny walnut ribbons peel off with a sharp lathe tool?

### Turning the blanks

When the blanks are cured (three or four hours at a minimum), trim one end square and chuck one up in your spigot chuck. For the female insert, turn to 1.1" diameter as close to the spigot jaws as you dare.

This should give you enough material to make two inserts, either male or female. I make the females first, that just seems to me to be the easiest.

The female insert is drilled .75" diameter x .75" (or a little more) deep. I use a Forstner bit.



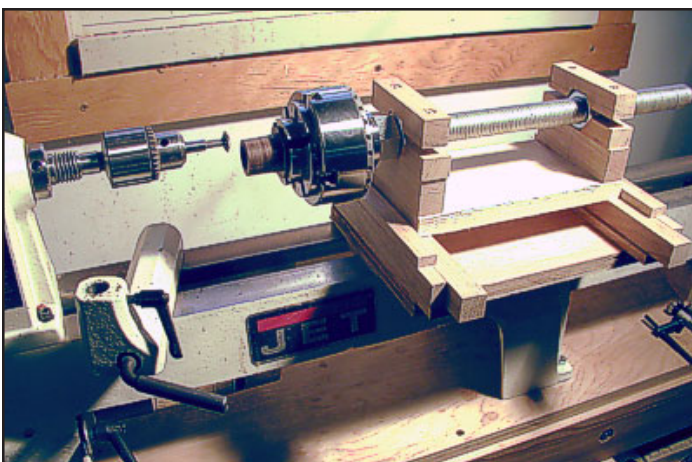
With the female insert blank still in the chuck on the headstock, mount a drill chuck in the tailstock and drill the inside of the insert to receive the thread cutter.

### Threading the female insert

The threading operation is the most complex and requires a fixture and a bit of set-up. My shop-built fixture is pictured here. Since my lathe headstock is threaded 1" x 8 threads per inch (tpi), a standard 1"x8tpi ready-bolt and three hex nuts were all the parts I needed. The base fits the lathe ways and clamps securely to the bed with a couple of 1/4" carriage bolts. The fixture carriage moves back and forth in a set of captive runners, fitted as tight as I could and waxed for smooth operation. When in position in relationship to the cutter, I lock the carriage with a c-clamp. Crude, yes, but it works fairly well.

You can buy a similar fixture from Bonnie Klein, [www.bonnieklein.com/tjig\\_product.htm](http://www.bonnieklein.com/tjig_product.htm).

The cutter is a 60° x 3/4" cutter from MSC Industrial Supply Co. (part no. 0396052, page 421 of "the big book") [www.mscdirect.com](http://www.mscdirect.com).



My shop-built threading fixture is shown here with the spigot chuck mounted on the fixture's ready-bolt and a drill chuck with the thread cutter mounted in the lathe headstock.

I made this fixture two or three years ago, to cut threads on turned boxes and found it works as well on threaded inserts for game calls.

In operation, remove the spigot chuck from the lathe and thread it onto the fixture's ready-bolt. Lock it in place with the third hex nut. It's important that the chuck does not turn on the ready-bolt during threading. Mount the drill chuck in the headstock (I use an MT2 taper shank drill chuck) and make certain it is securely seated. Threading causes a bit of vibration and may loosen the drill chuck. Mount the cutter in the drill chuck with as much shank extended as is practical.

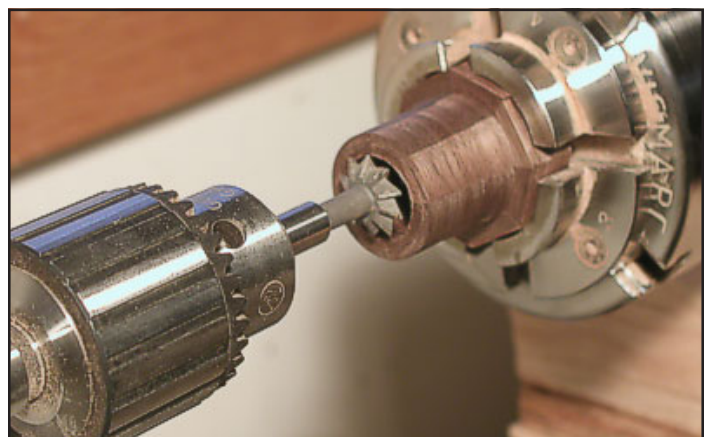
Back the ready-bolt with chuck attached to its far right-hand position and slide the fixture so the end of the blank is within 1/8" of the cutter. Clamp the fixture's base to the lathe bed.

Adjust the carriage to give the right depth of cut by the cutter. What is the right depth? Perhaps a machinist would differ but I try to cut thread that don't quite form a sharp edge. In wood a sharp edge is apt to split or break away. For this application, my fixture turned out to be just right since it's a tad bit lower than the center of the headstock, just enough to cut threads in the female insert when the carriage is lined up vertically with the headstock. Lock the carriage with a c-clamp.

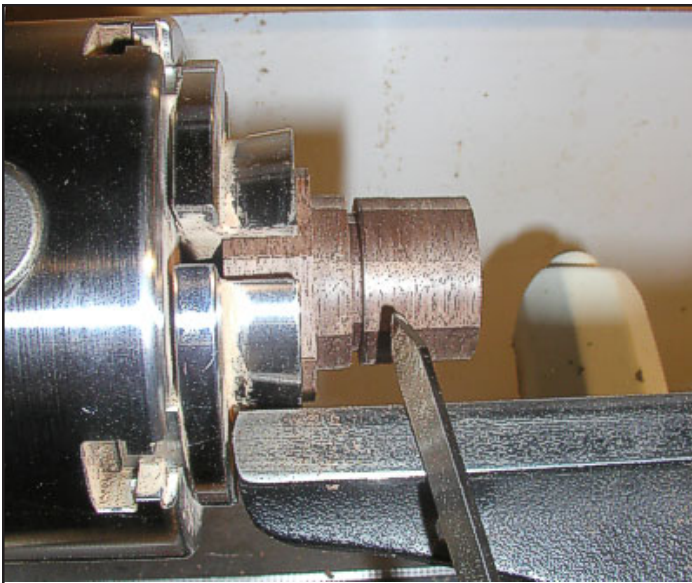
With everything lined up and locked, turn on the lathe at about 1500 RPM and then slowly rotate the ready-bolt, chuck and blank all together. As the work rotates and advances, the cutter cuts perfectly spaced 8tpi.

I cut threads 2.5 turns of the ready-bolt so the male insert will bottom out and provide a positive stop when the stopper is screwed into the barrel.

With the inside of the female insert threaded, remove the chuck (with the insert still in place) from the threading fixture and replace it on the lathe headstock.



With a 60° x 3/4" cutter in the headstock and the female insert in the threading fixture, rotate the ready-bolt to advance and rotate the work to cut perfect 8 threads per inch.



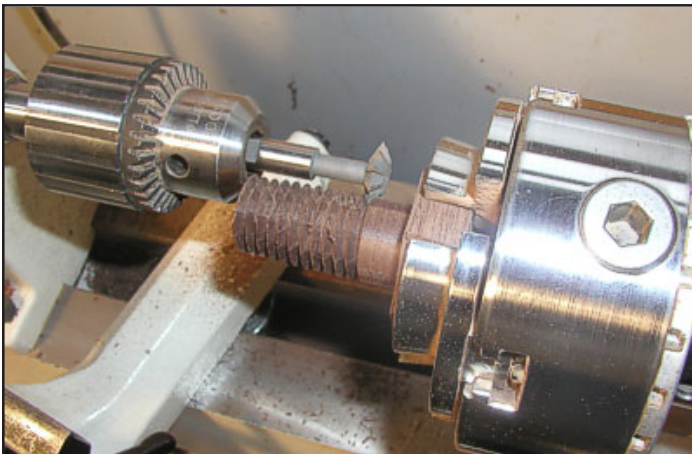
Part off the female thread insert with a narrow parting tool to produce two sets of inserts from one blank. This is the second one cut from this blank.

With a narrow cut-off tool, part off the insert at .75" There should be enough material left on the blank to make a second insert in the same fashion as the first.

### Threading the male insert

With the female inserts completed, discard the butt of the female insert blank and chuck up the second blank for the male inserts. Turn the blank down to .90" along it's available length, about 2" or a little less. Unlike the female insert, we'll drill the male insert after the threads are cut.

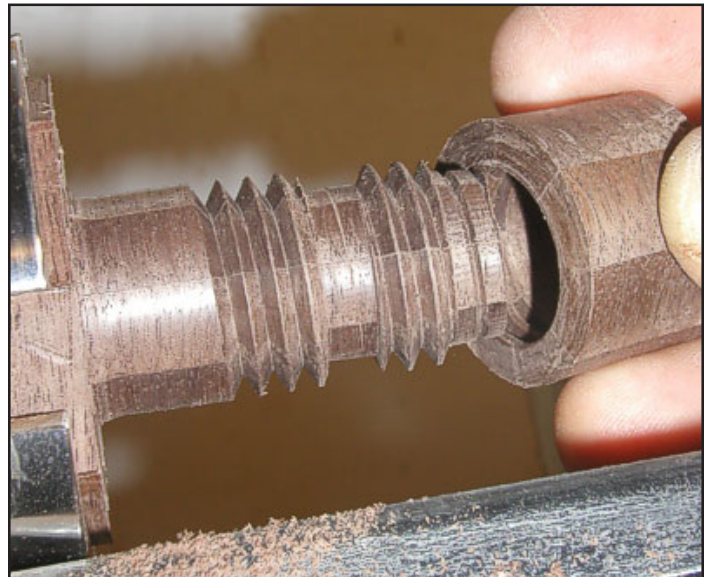
Remove the chuck with the male insert attached and install it on the thread cutting fixture. Install the drill chuck and cutter on the head stock and position the fixture for cutting threads on the outside of the insert. I do this by



Turn the male thread insert to .90" and thread it outside far enough to made both inserts.

eye-ball, I suppose a more precise setting can be suggested by a machinist. Unlike cutting threads in steel, you can cut wood threads full depth in a single pass if you go slowly with the rotation of the ready-bolt. I cut only two or three threads, mark the position of the carriage and then check by sliding the carriage away from the cutter and testing the female inserts. Invariably, one of the female inserts is smaller than the other, so I cut mating threads for the smaller one first.

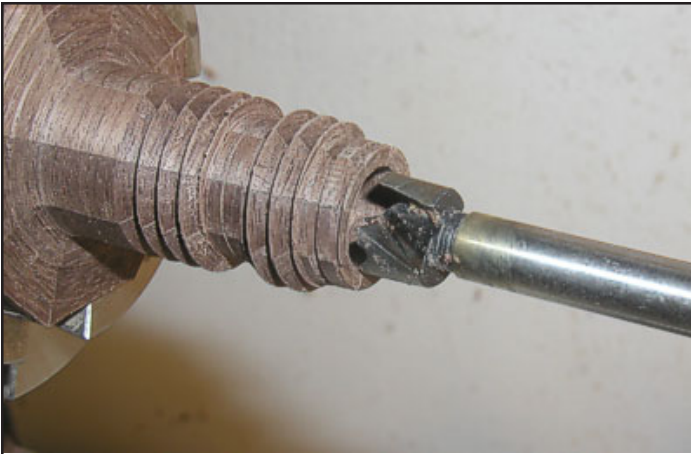
The male inserts will also be .75" overall in length, with a .125" pilot, 2.5 threads and a stub of about .375" to fit inside the stopper. With the cutter chucked in the drill chuck extending a far out as possible, you can thread the blank far enough to make both inserts. If the two female inserts are, indeed, slightly different in inside diameter, be sure to adjust the carriage to fit the larger insert part way through the threading process.



Turn down the threads for a guide pin and test fit the female insert. The two female inserts may be a bit different so the male inserts might also need to be threaded a little deeper to fit well.

With the threading done, return the chuck and blank to the headstock, turn down the pilot to fit the unthreaded bore of the female insert, (in my calls that's .625") leave 2.5 threads and turn down the .375" stub that will fit inside the stopper (mine measured .70"). I then screw the female insert onto the male insert and true up the outside diameter of the female insert (mine measured 1.1"). Use very light cuts with a very sharp tool for this work.

Remove the female insert and bore the inside of the male insert to fit your choice of guts (I use a .5" Forstner bit). Part off the first insert and be sure to keep the matched set together. You should have enough threads left to cut the second insert in the same fashion.



Drill the male inserts after the threading is done. The bore is sized to fit my tone boards (1/2") and is drill through the insert, one at a time.



The completed sets of inserts look like this. The walnut male insert

### Cutting the barrel and stopper recess

Now you'll have to open up the stopper end of the barrel to receive the female insert. I use an aluminum mandrel with O-ring tires mounted in a collet chuck and turn the recess with a small skew chisel's long point. Since the inside of the female insert is bored the same diameter as the barrel, the insert could be fitted right after the barrel blank is bored on the lathe and before the barrel is turned

to outside shape. In the example shown here, I had already turned the barrels to their finished outside shape.

This is a tedious process of cutting a bit in the recess, then test fitting the insert, then cutting a bit more. You'll want a recess that fits the insert fairly snugly to properly align the stopper to the barrel when finished. It's a good idea to cut the recess a few thousand's deeper than the length of the insert to allow for finish sanding of the



With the male insert completed, thread on the female insert and very carefully true up the outside diameter.



Turn the recess in the barrel with a small, sharp skew chisel to the depth and diameter require for a snug fit of the female insert.

barrel end. The recess in the stopper is cut in the same fashion and the male insert can be fitted either before the stopper is turned to shape or after.

### Gluing the inserts

With both inserts fitted to the barrel and stopper respectively, its time to glue them in place. If you use polyurethane, do not wet the surfaces and devise a clamping method. With a fairly tight fit, polyurethane will make a good joint, activating with no more than the moisture in the atmosphere, even in a heated or air conditioned shop, it



Test fit the female insert in the barrel to assure a snug fit. Fit the male insert in the stopper the same way.



The inserts are fitted and glued in place. The outside is finished here, the inside of the call, including the threads will receive a tung oil finish.

just takes a lot longer to cure. I use weather resistant Pro Bond because it does not require clamping and is nearly as water-proof as polyurethane.

Glue the female inserts in the barrel first and when cured, finish sanding the end of the barrel. Finish sanding the barrel end of the stopper and test fit the stopper on the male insert fully screwed into the barrel. The stopper and barrel should fit tightly together.

With the male insert fully seated in the barrel, decide if the stopper should fit against the barrel in a particular position of rotation. Many designs are best presented with the rotational relationship of stopper to barrel in a particular position. Very carefully apply glue to the stub end of the male stopper and seat the stopper in the desired position. Be careful that glue squeeze-out does not ooze out and glue the two inserts together.

Once the glue in the stopper is cured, you can unscrew the stopper and proceed with installing the guts. Hopefully you've correctly aligned the stopper and barrel so that every time to screw the two together, you'll get the perfect alignment.

I finish both inside and outside with several coats of tung oil to inhibit moisture absorption. A top finish such as varnish should be applied very thin so as not to fill the threads.

A note of caution: This bit of novelty in callmaking will require more maintenance than a friction fit since moisture absorption may lock the barrel and stopper together much easier. Warn your customers to loosen the threaded stopper whenever the call is not in use - and of course, to tighten it when in use.

The finished set at right will always line up as shown when the stoppers are screwed in to their limit.

