How to Turn an Lathe into a Table Saw

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I recently acquired a Taig lathe, so I built a base for it, the motor and some drawers to keep tools and accessories out of the dust. Figure 1. The material is ¾ inch melamine particleboard, so it's easy to clean, heavy, vibration free and strong. I added some T-slot track on the front and the back: the original intention was to use the back track to hold a work light, and the front track to hold a duplicator. However, I got a few other ideas. I now have a powered shaft, so could this be used to make a thickness sander or a table saw? I have a full size metal wood working shop, so anything is possible with time and imagination.

Figure 1. Taig lathe and base.

The first step for a table saw is to build an arbour, shown in Figure 2. I use 1 inch bore slotting saws on my milling machine, so I standardized on this for diameter for the arbour. I have also acquired some other small saws – there are many cheap carbide saws available for the hand-held battery powered saws. Since they are smaller bore (typicall 10 mm or 3/8 inch), I re-bore them to 1 inch.

The arbour threads on to the nose of the head spindle and runs on a live centre on the tailstock. It looks over-strong for the application, but the span between the head and the tail is quite long because I wanted as much room for the table as possible. Maximum saw diameter is about 4.25 inches.

Figure 2. Saw arbour.

Figure 3 shows the completed table saw attachment, including the fence, mitre and height adjustment. Subsequent pictures show the details.

Figure 3. Completed table saw attachment.

Figure 4 shows the table saw module removed from the lathe base. On the back of the module are two T-bolts that go into the T-slot on the back of the lathe base. I have subsequently added two adjusting (push) bolts for aligning the table square to the arbour.

Figure 4. Table saw module. T-bolts (circled) hold base to T-slot at the back of the lathe base

The slots on the top of the table saw are also T-slot track. This is convenient for adding jigs and feather boards. The picture shows an improvised stop for cutting thin strips.

The table top is pivoted on two bolts at the back edge of the table. This is better shown in Figure 5. The design was inspired by the system used on most of the small thickness sanders on the market. (At some point, I hope to build a thickness sander module as well.) In this figure, it just possible to see the height adjustment (below the fence). Figure 6 is a view from the front, showing two knurled nuts on a threaded rod of the height adjuster. The height adjustment is done by spinning the top nut, and the bottom nut is just for security. The adjustment mechanism is overbuilt for this application, but the size of the nuts is convenient for finger adjustment without the use of wrenches. For a saw change, the bottom nut is removed and the table pivots up (Figure 7).

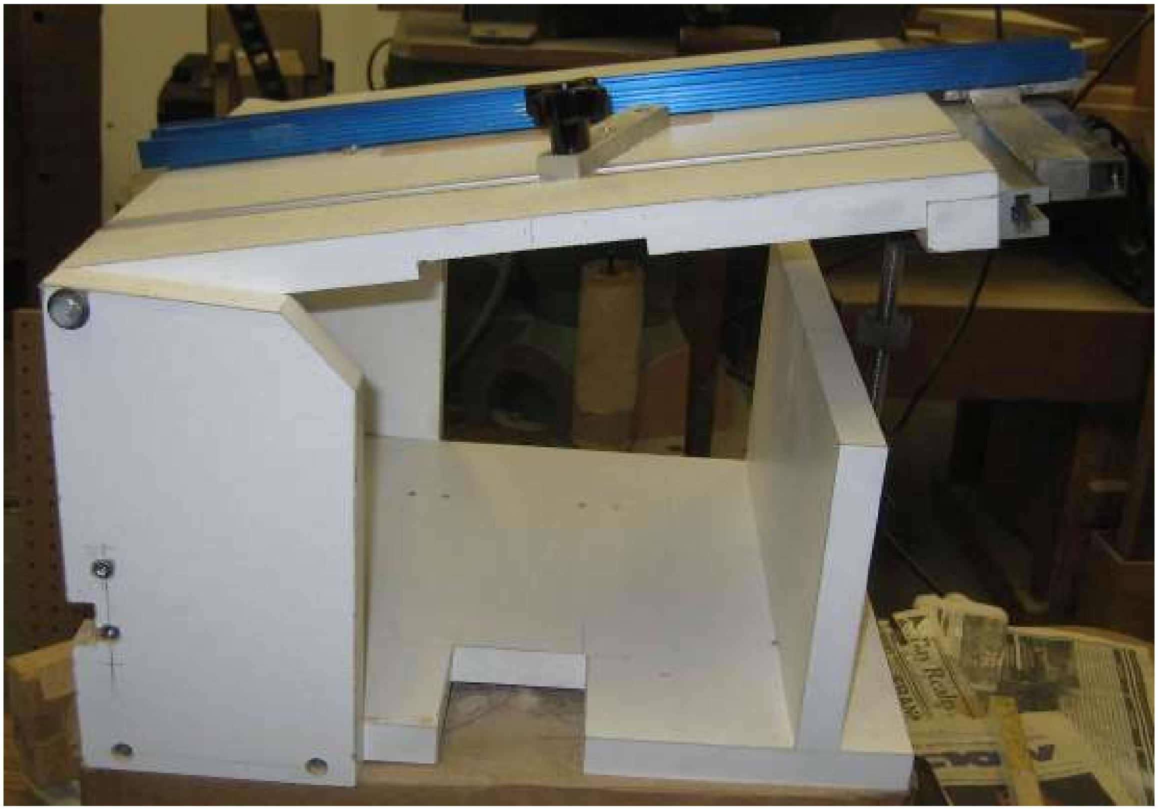

Figure 5. Table saw module from the side.

Figure 6. Table height adjustment and details of the fence.

Figure 7. View with table pivoted up.

The fence is a modified version of the Biesemeyer design. See Figure 8. The standard design has the fence in the middle of the bar that runs on the rail on the front edge of the table. This would have limited the maximum opening of the fence too much, so I redesigned the clamping mechanism to allow the fence to be at one end of the bar. The problem was to avoid the fence moving when the bar bends as the eccentric clamp applies the clamping force. The trick was to add a load equalizing bar that moved the clamping forces onto the points where the squareness is adjusted, which are on the ends of the main bar, as shown in Figure 8.

Other design details that ensured a fence that would not flex are:

1. The fence is wide, so it will not flex itself. A piece of Kreg Combo-Trak was used because it is wide and it has a T-slot to allow fixtures and feather boards to be added.
2. As with the Biesemeyer design the bar length is half the distance from the edge of the table to the saw
3. The connection between the bar and the fence was done with press-fit slots that provided mechanical strength well beyond what bolts could provide. See Figure 9.
4. The T-track rail on the front the saw table was made from ¾ x ¾ inch stock to avoid it flexing. I found that the extruded T-track flexed.

The net effect is that the fence flexes only ± 0.0005 inches beside the saw.

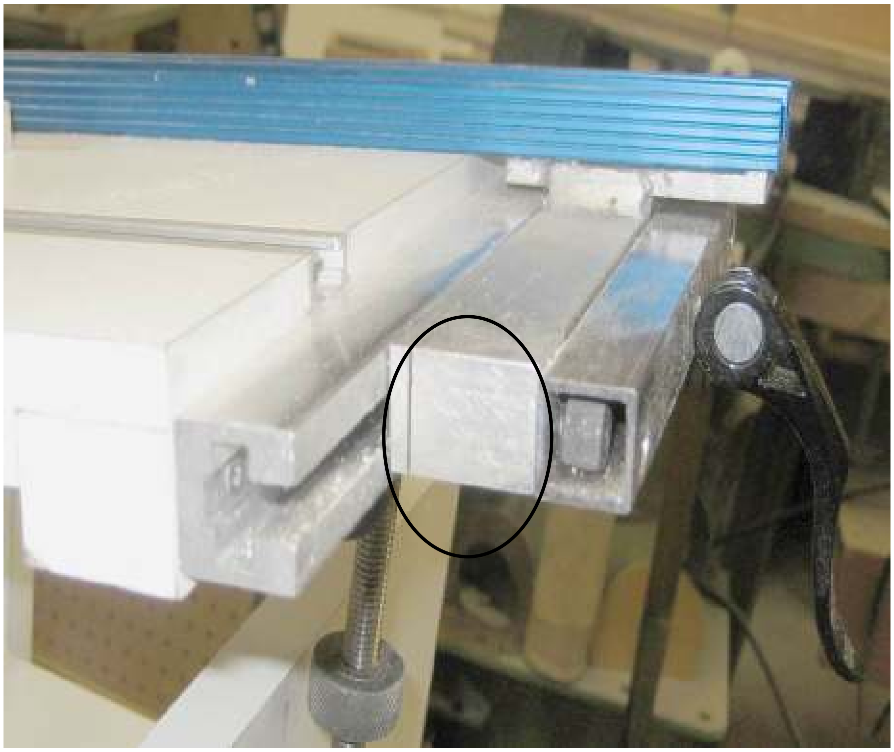

Figure 8. Fence design. Circled is the screw for adjusting the fence squareness.

Figure 9. Press-fit slots on joint between fence and guide bar.

At some point I will add a fine-adjustment screw for the fence. I plan to use a compound thread system: a rod with 1/4-28 (NF) thread on one end and 1/4-20 (NC) thread on the other. One turn of the rod results in 0.00143 inches (1/20 – 1/28) of relative movement. I'll put a 14 sided thumb-wheel on the rod, so a turn of one flat is about 0.001 inch of adjustment.

I made a mitre, shown in Figure 10, which started life as a piece of 2 inch steel angle. After cleaning it up I bolted on a small protractor. The round outline and slot were done on the milling machine with a rotary table.

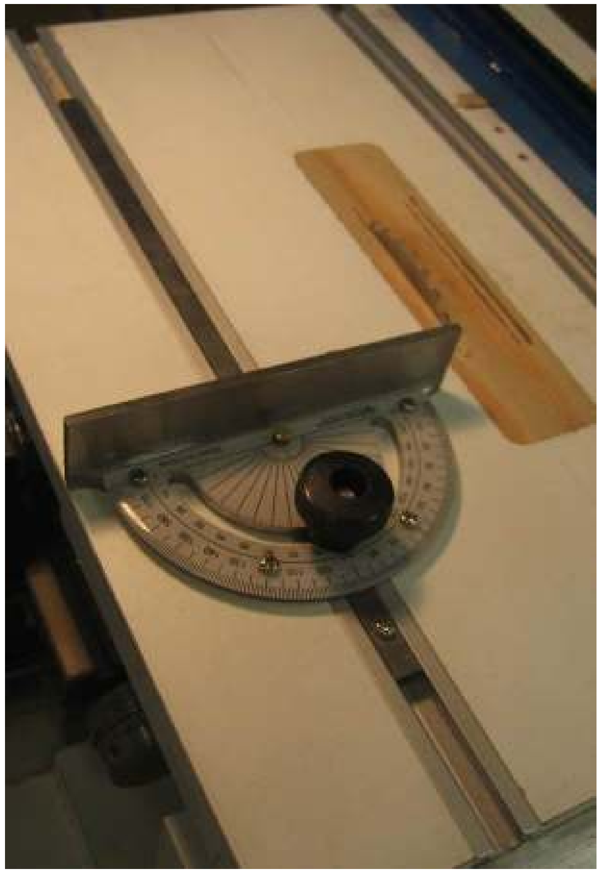

Figure 10. Mitre and saw insert.

The last detail is the saw insert, shown in Figure 10, which is a piece of 3/8 inch plywood press-fit into a pocket in the table. The saw cuts its own zero-clearance slot as the table pivots down.

A few notes on alignment of the saw and fence: When using a slitting saw, which does not have any side clearance (the tooth tips are the same width of the saw body), the fence need to be exactly parallel to the saw, otherwise the saw will heat up and bind. The fence can be slightly open at the back of the saw, but not too much.

Overall, the concept of the tilting table should be very useful for DYI table saws. Some precision is needed for ensuring the pivot holes are drilled square to the base, but this is not too critical if the error is small enough to be adjusted out.

Feci quod potui, faciant meliora potentes