

Wheel Making

Richard Dlugo for NWWT - September 7 & 8, 2017

Although toy wheels are available for purchase, most manufactured designs are pretty plain. Here are some ways to make smart looking wheels.

Decorative techniques: beading tools, wood burner, chatter or geared texture too
Wheel texturing jig - A home-brew jig that uses a router and indexing

Grain orientation for painting

- face grain sides mean uneven paint absorption on wheel treads, more even on face
- end grain sides gives very even paint absorption on wheel treads. Wheel face will also absorb finish evenly.

YouTube Videos

Tractor wheels on a table saw

<https://www.youtube.com/watch?v=oaRK0sp7piM>

Spoked wheels

<https://www.youtube.com/watch?v=lodTe4uPLxs>

Simple Wheel with Design on Hub

Mount a wheel block using an screw chuck. Turn the tire tread face flat. Turn the hub face with a convex profile. Separate the tire from the hub by turning a bead. Decorate the hub. You can decorate with a wood burner and colored pens and pencils. if you leave the hub surface flat you can decorate with self-adhesive stickers.

Simple Treads

You can simulate treads by simply cutting shallow equally spaced grooves in the tire surface.

Using a geared texturing tool.

Create a tire shape. Mount a gear with fewer teeth in the texturing tool. Set the gear angle to about 45° Set the lathe speed to around 200-300rpm. Push the gear into the wheel rather quickly and firmly. You'll get the treads slanted in one direction. Now rotate the gear angle to 45° in the opposite direction. Again push the gear into the wheel. Voila! You'll get a criss-crossed tread pattern.

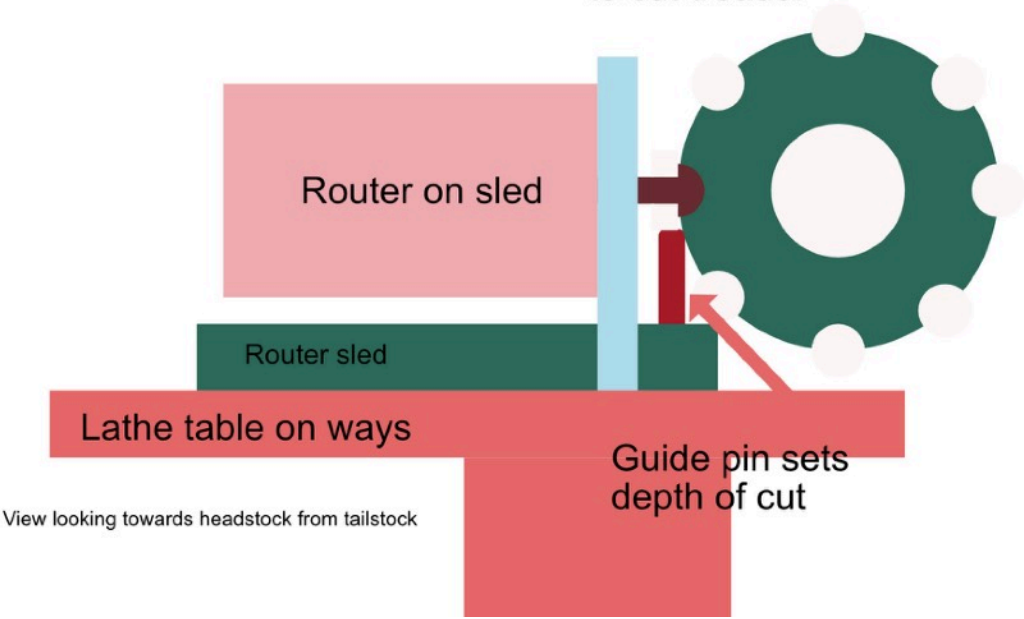
Large treaded wheels using a router.

Perpendicular Treads



Routing treads perpendicular to tire face.

Wheel is mounted on lathe and indexing is used for treads. Move router left and right to cut treads.



Angled Treads Monster Truck Tires

These are large wheels with 45° angled treads. The Monster Truck wheel is about twice as wide as a tractor wheel. Treads are made using a router mounted on a homemade lathe table.



Tractor Tires

Tractor tires are simply narrower than monster truck tires. Both types of tires follow the same routing steps.



Angled tires require a jig that will hold the wheel and allow indexing. The jig is simply a cylinder that has a tenon to fit your 4-jaw chuck, and a 45° beveled surface at the opposite end. In the center of the bevel a hanger bolt has been screwed in to hold the wheel.

First turn a basic wheel with a 1/4 hole in the center. You may want to create a recess for the hub at this time. You will want to create a test wheel first and check all your router table, fence and depth of cut settings first. Then use this wheel as a template for the other wheels you will make with the same design.

Decide how many treads you want to rout. Make sure you consider the size and depth of the router bit you will use. Use the indexer on your lathe to scribe pencil lines across the surface of the treads.

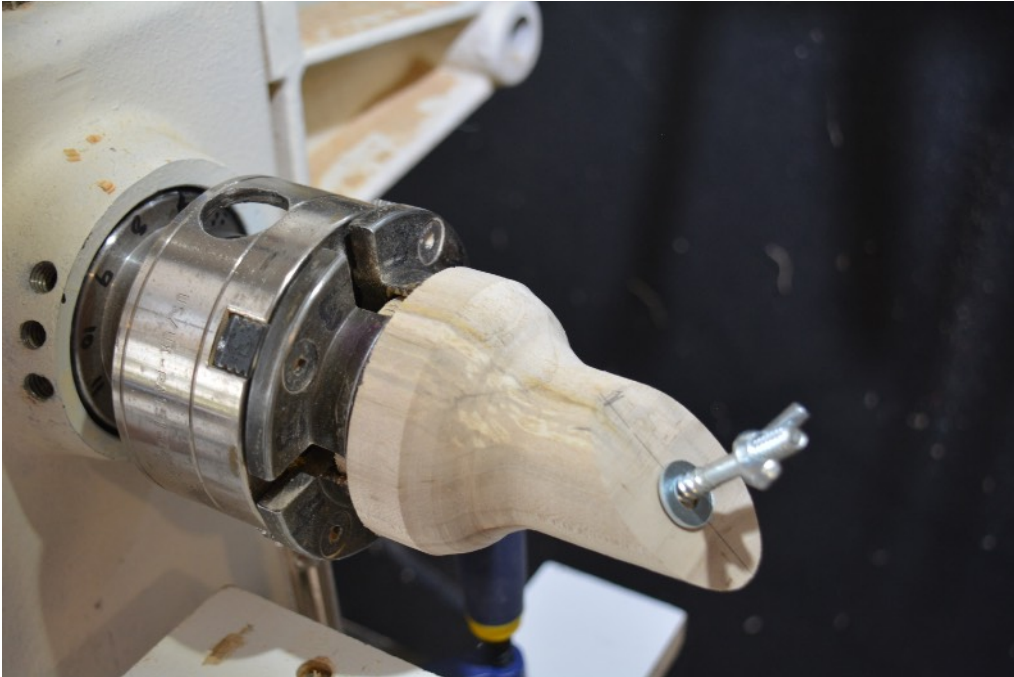
Mount the 45° routing chuck in your 4-jaw chuck and position it with the short side of the chuck directly up. Lock the lathe spindle in position. Attach the wheel onto the hanger bolt. Position your router and any fences you'll need on the router table to control its movement. Position the guide pin and depth of cut that the bit will take. Position the bit at your first index line. Start routing. To keep the wood from possibly burning, take 2 or 3 shallow cuts rather than one deep one.

To do the other side of the wheel turn the chuck 180° so that the long side of the chuck is directly up. Position everything again. You may need to reposition the depth of cut.

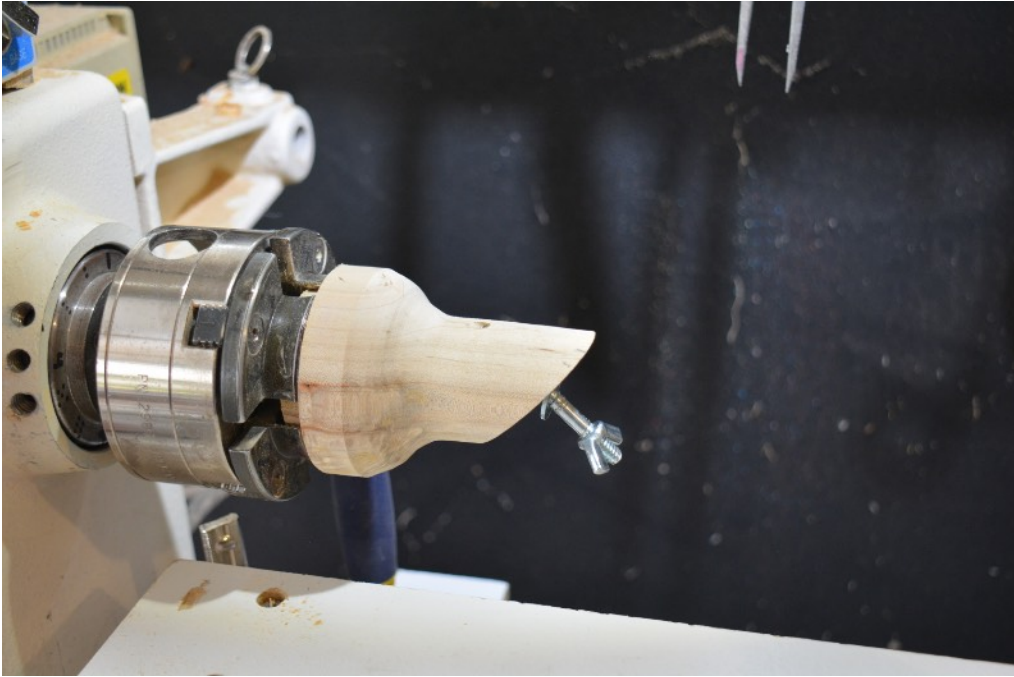
Because of all this repositioning it should make more sense now for you to make a test wheel first. Also once you finish one side of one wheel, do all the same sides of the rest of the wheels so that you reduce the amount of setup time.

Be aware of the placement of the hub so that the treads will be correctly oriented for each side of the vehicle. Thus you can make the treads

45° chuck in up position



45° chuck in down position



Chuck with wheel attached



Bit in a tread groove controlled by the guide pin.



These two photos show another version of the 45° jig. This one has a 1/2" hole drilled in the middle and facilitates the use of a Beall collet. The usefulness of this is that you can create a larger recess in your wheel before you rout the treads. The disadvantage is that it's harder to lock the wheel in place as you rout. You'll need some tape or other means to secure the wheel. Or if you're well coordinated and think you can do it safely, you can just try holding it with one hand while you move the router sled with the other.



Spoked Wheels

The biggest challenge with these is to get the hub exactly in the center of the wheel. Most methods have you making the hub and wheel separately then attaching spokes. This method has you working in a block of wood in which you will drill holes for the spokes and then create a recess in the block between the rim and the hub.

Create a cylinder as show in the diagram. Use dimensions appropriate for the piece you are making. Turn the largest diameter to that of the rim you want to make.

Use the indexer to mark the positions for the spoke holes. Drill these straight in through the rim right into the hub.

Next create a recess for where the spokes will be visible. As you create the recess the spoke holes will become visible in the hub. Tap in the spokes.

When all spoke have been tapped in clean up the excess protrusions and sand. Then part off behind the rim.

You can then make a tire to fit around the rim.

