

Cornerstone Electronics Technology and Robotics II Making Small Robotic Wheels

This section outlines the process of making an aluminum wheel from 1 1/2" stock (381 mm). The finished wheel is shown below:



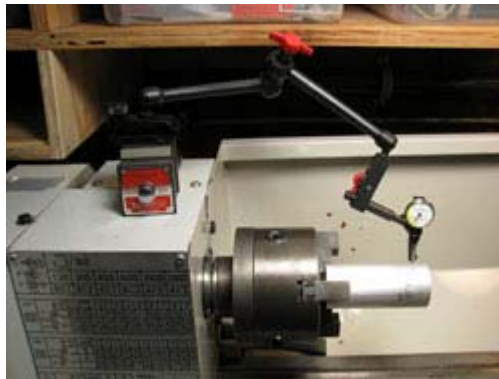
Finished Aluminum Hub with O-ring Tire



View Showing Set Screw

Step 1: Use a bandsaw or cut-off saw to cut off a piece approximately 3 1/2" (85 mm) long from the 1 1/2" aluminum stock. Source of 1 1/2" aluminum stock: [MSC Industrial Supply Co. Part #02629426](#).

Step 2: With a ["Last Word" Dial Test Indicator](#), center the stock in the lathe chuck to remove as much wobble as is reasonably possible. Our small bench lathe will not permit the 1 1/2" stock to go through the spindle.

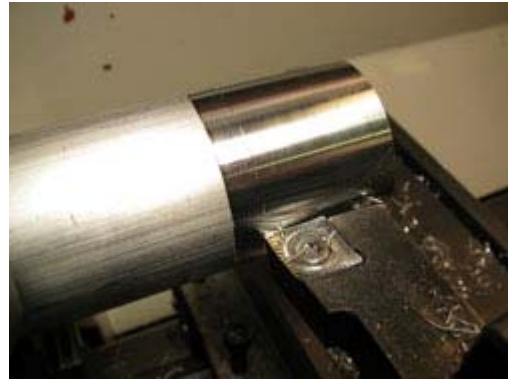


Removing Wobble with "Last Word"

Step 3: Face and turn stock. You may want to perform Step 5 before turning the stock in order to provide support for the free end.

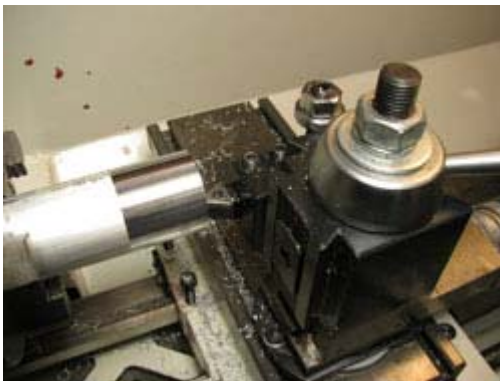


Facing 1 1/2" Stock



Turning Stock

Step 4: Face outer wheel design.



Quick Change Toolpost Set-up



Facing Design

Step 5: Center drill the stock and support free end with a live center inserted into the tailstock.

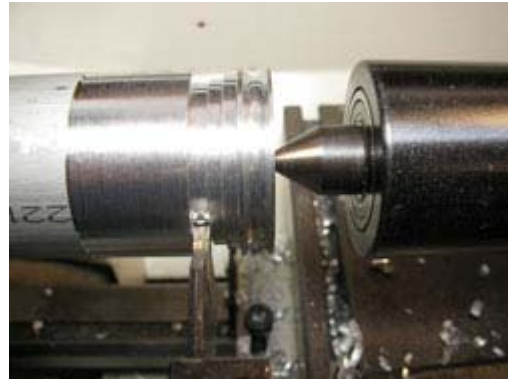


Center Drilling Face

Step 6: Turn groove for O-ring. Tool holder for insert: [Dorian](#) NSR 12-3B. Positive Radius Grooving Insert: [Agi-VR/Wesson](#) VRR-3094R VR772, search VRR-3094R on Agi-VR/Wesson site. (Radius = 0.094" (48 mm)). Source: <http://www.anichind.com/index.asp>.



Quick Change Toolpost Set-up



Grooving Stock to Receive O-Ring

Step 7: Set-up toolpost with parting tool to cut shaft notch. Cut notch in 3 steps. Leave a little extra width of the flat outer surface to the left of the groove when cutting the notch.



Quick Change Toolpost Set-up



Turning Notch in Steps

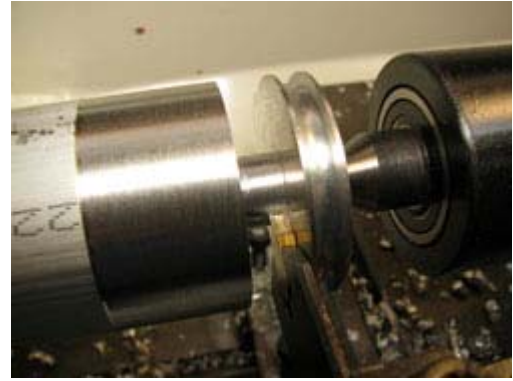


Nearing Completion of Notch

Step 8: Face the inside surface of the wheel and at the same time make the flat outer surface to the left of the groove the same width as on the right side of the groove.



Facing the Inside of the Wheel



Facing the Inside Complete

Step 9: Select a drill bit slightly larger than the motor shaft and mark the bit such that the drill bit will not penetrate where the parting will take place. Make sure that you have enough shaft left after parting to accommodate the set screw. Drill the hole into the face.

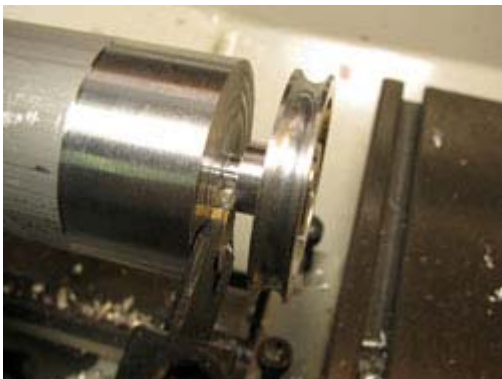


Mark the Bit for the Proper Depth



Drill Motor Shaft Hole

Step 10: Part wheel from stock and insert the O-ring. O-Rings: 3/16" Cross Section x 1 1/4 ID x 1 5/8 OD O-Ring.



Part Wheel from Stock



Install O-Ring Tread

Step 11: Finish drilling motor shaft hole on a drill press. use a hollow square extrusion to support the wheel.



Finish Drilling Motor Shaft Hole

Step 12: Locate the center of the set screw shaft.



Locate Center of Shaft



Center Located

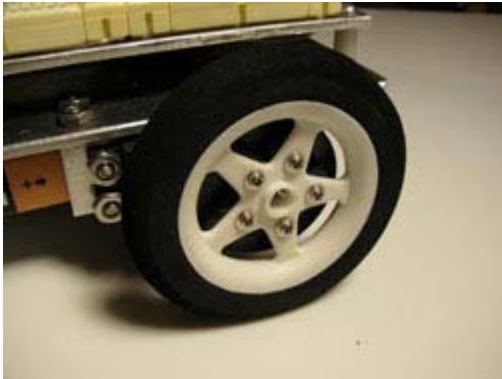
Step 13: Drill set screw hole in shaft and tap for set screw.



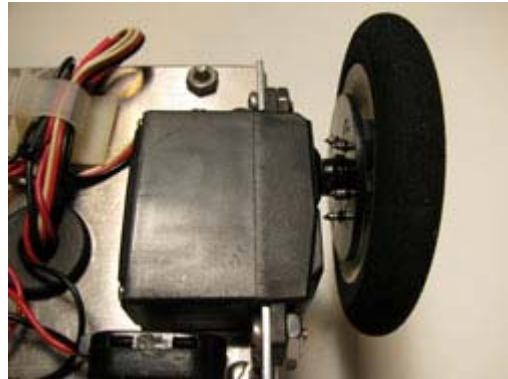
Drill Set Screw Hole

Making Servo Mounted Wheels:

This section mounts the [Maxx Products 2.5" light foam wheels \(EPW250\)](#) onto a round servo horn. Alternate wheels are the [Du-Bro 2.5" Micro Sport Wheels – Cat No. 250MS](#). A finished wheel is shown below:



Foam Wheel Mounted to Servo Horn



View from Bottom Side

The photos below show the Futaba servo parts used and some assembly details.



Finished Wheel



Futaba Servo Horn Parts Used



Spacers between Wheel and Horn



Horn Attached