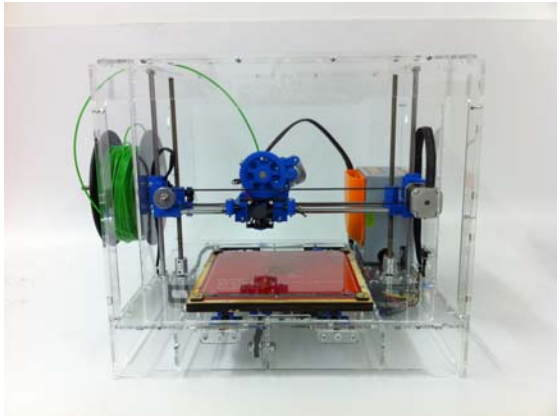
PLASTIBOT

Mendel 3D Printer Assembly



Section 4

Extruder Assembly

Step 1: Cleaning plastic parts

Parts Needed:

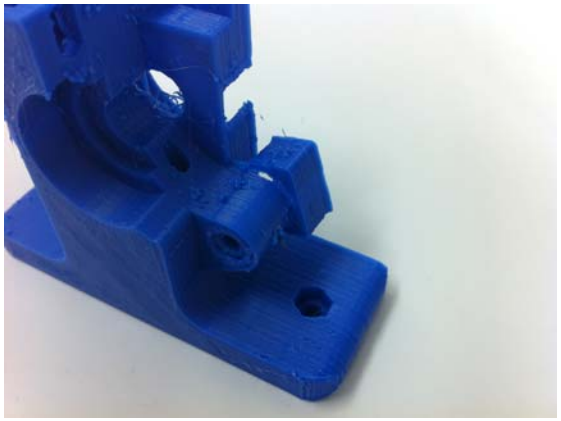
- Greg's Wade extruder
- Greg's Wade idler
- Greg's Large Gear
- Greg's Small Gear

Tools Needed:

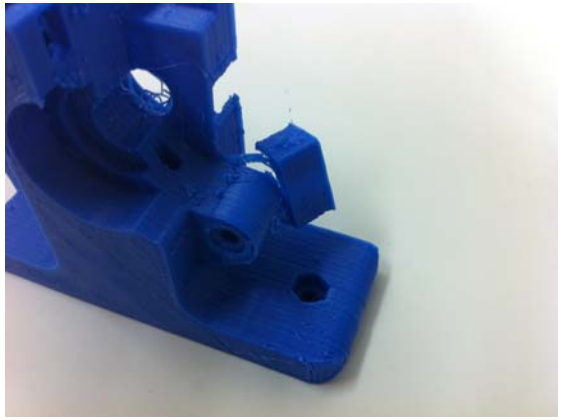
- Chuck with 1/8" drill bit
- Chuck with 5/16" drill bit
- Chuck with 5mm drill bit
- Wire clippers or knife.
- Round file
- Flat file

Locate the items shown above.

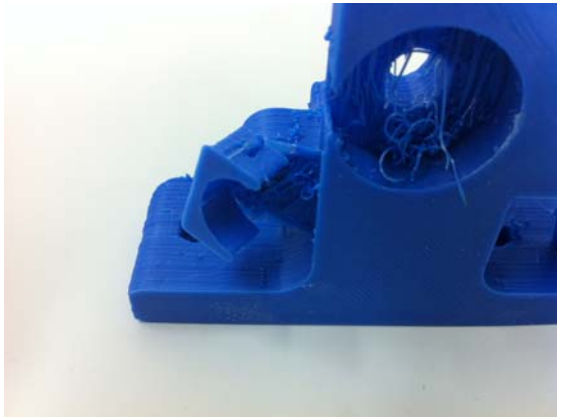
Use the chuck with the 5/16" drill bit to drill out the hub hole



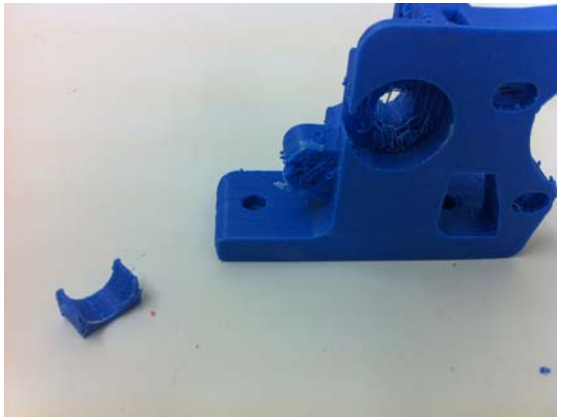
The cube shown on the center of this picture is support material and needs to be removed as shown in the following pictures.



Push the block with your thumb and it will snap off with minimal resistance.



Here is a view from a different angle. You can see that the block is actually hollow and only a few strings are making contact with the idler hinge.



Then twist to snap off the last few strings of plastic and remove the block

Step 2: Cleaning plastic parts (Cont).

Parts Needed:

- Greg's Wade extruder

Tools Needed:

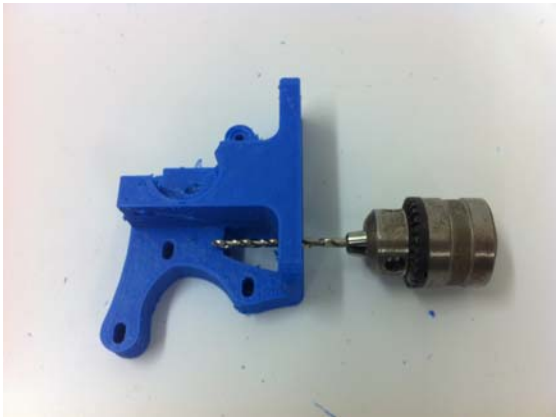
- Chuck with 1/8" drill bit
- Round file

Use the chuck with the 1/8" drill bit to drill out the hole on the idler hinge.

Use the chuck with the 1/8" drill bit to drill out the holes for the stepper motor (3 of them) as shown in this and the next two pictures.

This is the second hole for the stepper motor to clean. The third one is right below the other 2 you just cleaned. Make sure you clean that one too.

Clean the third hole.



Use the chuck with the 1/8" drill bit to drill out the extruder mounting holes in the base (2 of them).

This is the second extruder mounting hole to drill out.

Step 3: Cleaning plastic parts (Cont).

Parts Needed:

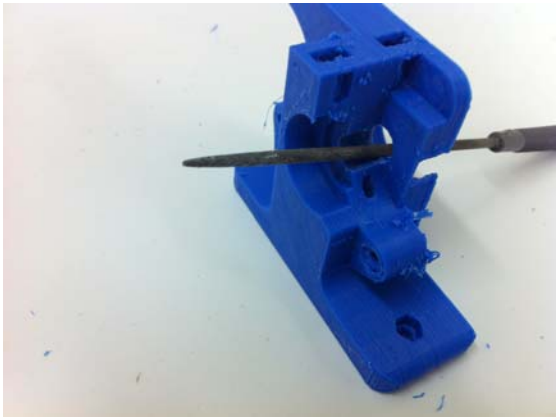
- Greg's Wade extruder

Tools Needed:

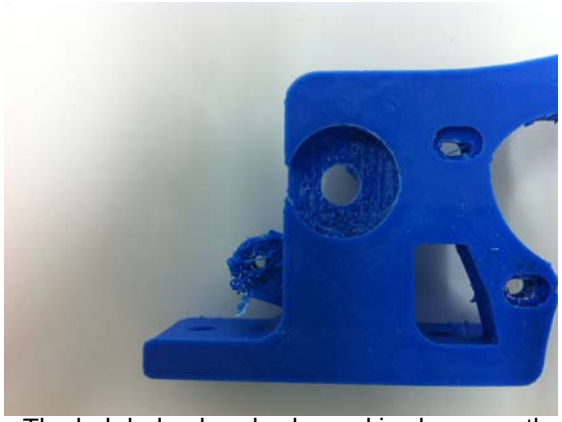
- Round file

Clean out the plastic extrusion hole using the same 1/8" drill bit.

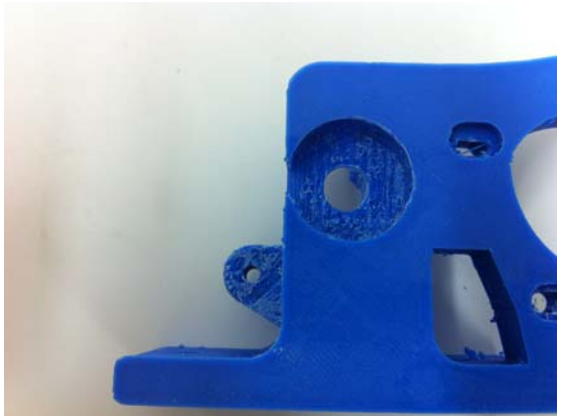
Note the strings left around the hub hole after we used the drill bit. Those need to be cleaned with a round file.



Use the round file to clean any strings left on the hub hole



The hub hole already cleaned is shown on the top right corner of this picture. Now look at the hinge hole in the center of the picture. That one also needs cleaning.



Use the same round file to clean the idler hinge. Clean the hole as well as the outside. You can compare it to the uncleaned part on previous picture

Clean the 3 motor mount holes using the round file. Don't forget to also clean the recess holes where the screw head will go in .

Step 4: Cleaning plastic parts (Cont).

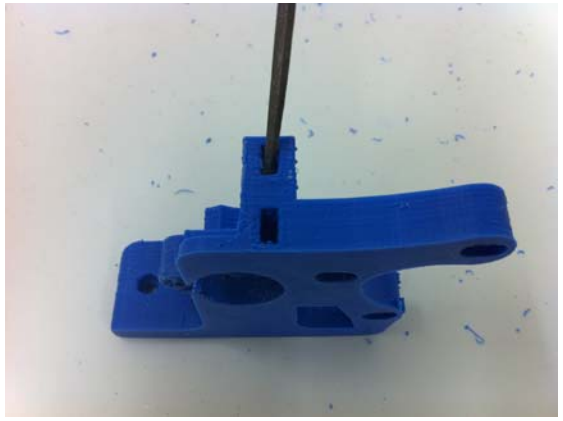
Parts Needed:

- Greg's Wade extruder
- Greg's Wade idler
- Greg's Large Gear

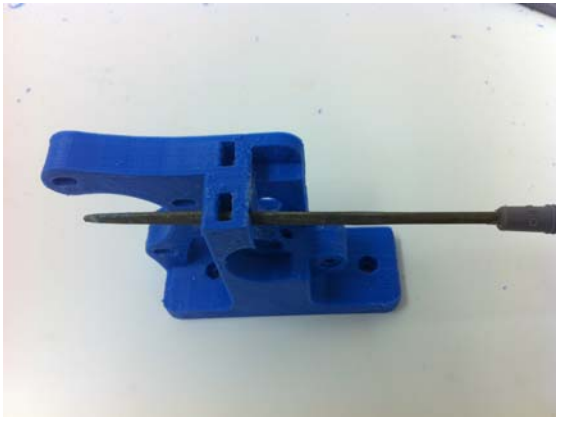
Tools Needed:

- Chuck with 5/16" drill bit
- Round file
- Flat file
- Wire clippers

The part should look like this once all holes are filed.

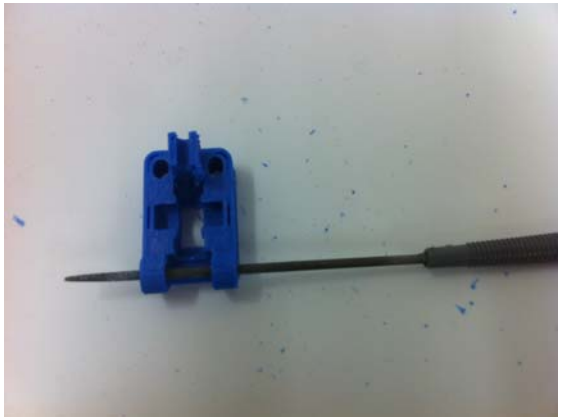


Use the square file to clean up the nut trap holes.

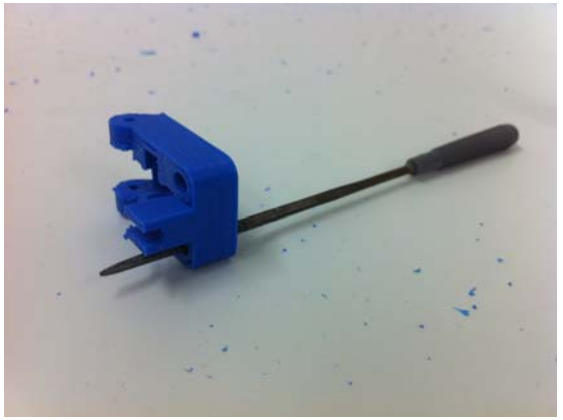


Use the square file to clean up the nut trap holes.

Use the 5/16" drill bit to drill out the hole on the large gear if needed.



Use a rounds file to clean out the hinge holes on the idle.



Use the round file to clean out the 2 holes where the compression screws will go

Step 5: Wade-idler assembly

Parts Needed:

- Gregs-wade-idler
- M3 Hex nut
- M3 x 25mm screw
- 5/16” x ¾” smooth rod
- ball bearing

Tools Needed:

- Heat gun
- Vise grip pliers (2 pcs)

Test to insert the ball bearing as shown here. If it doesn’t go in use the file to remove a little bit more material as shown on the next picture

Remove material using a file only if you have trouble press fitting the ball bearing.

Locate this plastic part. This is the shaft for the idler.

Remove the supporting material from the shaft.

Use a flat file to clean up the imperfections on the shaft until the ball bearing goes thru. Dispose off the ring part.

Locate the items shown in the picture above.

Step 6: Wade-idler assembly (cont.)

Parts Needed:

- Gregs-wade-idler
- M3 Hex nut
- M3 x 25mm screw
- 5/16” x ¾” smooth rod
- ball bearing

Tools Needed:

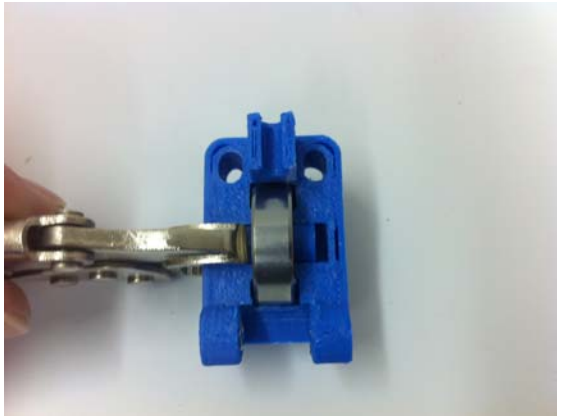
- Heat gun
- Vise grip pliers (2 pcs)

Insert the M3 x 25mm screw as shown and crew in the M3 nut. Then pull the screw to get the nut into the trap. If it doesn’t go in use the heat gun to soften the plastic around it.

This is how it should look after inserting the nut

Now take the smooth rod and insert it into the ball bearing as shown.

Place the shaft and ball bearing on top of the idler block



Use the vise grip pliers to press fit into position.

This is how the idler assembly should look.

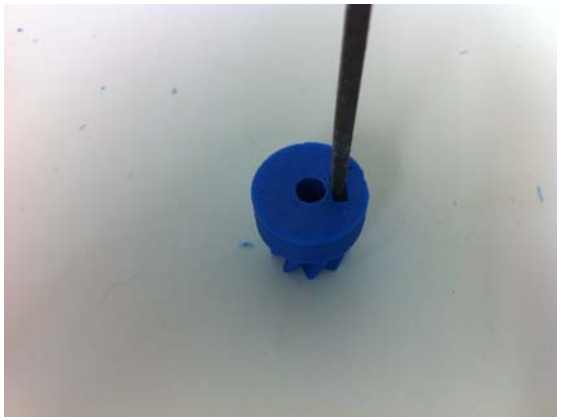
Step 7: Small gear assembly

Parts Needed:

- Small Gear
- 3mm setscrew
- M3 Hex nut

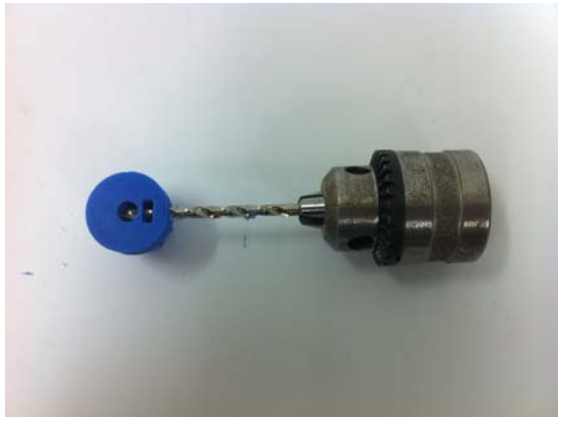
Tools Needed:

- Allen Key #1.5 (Metric)
- Wire clippers
- Chuck with 1/8” drill bit
- Chuck with 5mm” drill bit



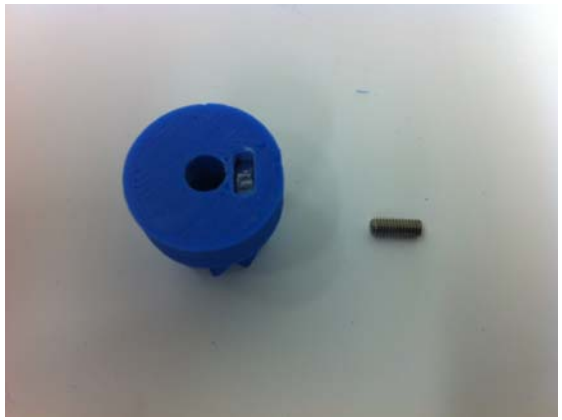
Use the square file to clean the nut trap.

Use chuck with a 5mm drill bit to drill out the hole where the shaft will be. Then use a round file to finish up the part until if fits tightly into the motor shaft.

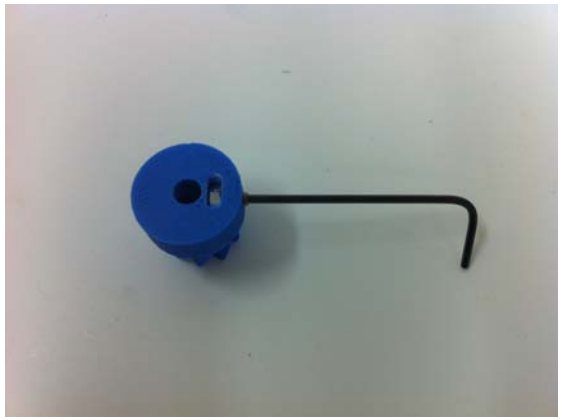


Use the chuck with the 1/8” drill bit to clean out the hole for the setscrew as shown on the picture above.

Place the M3 nut on the nut trap and press in position using the nose pliers.



This is how the nut should look. Also you can see the setscrew next to the gear.



Use the Allen key #1.5 to screw-in the setscrew as shown on the picture above. Do not go past the shaft hole.

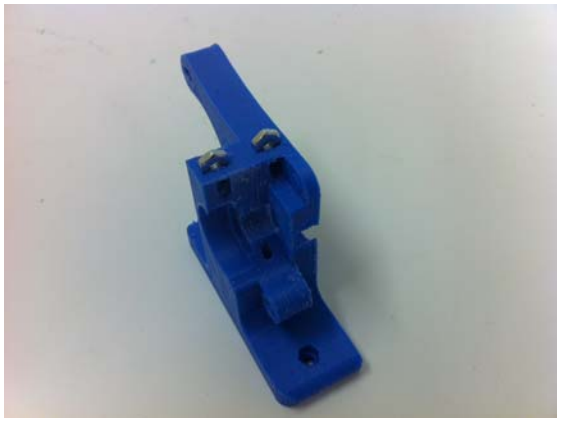
Step 8: extruder and large gear assembly

Parts Needed:

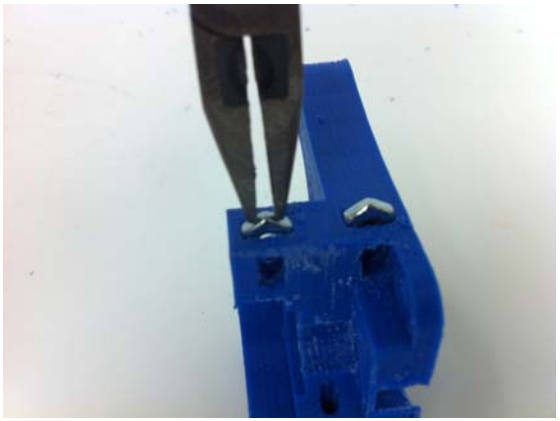
- Gregs-wade-extruder
- Gregs-Large-Gear
- 6-32 nuts (2 pcs)
- Hubbed bolt

Tools Needed:

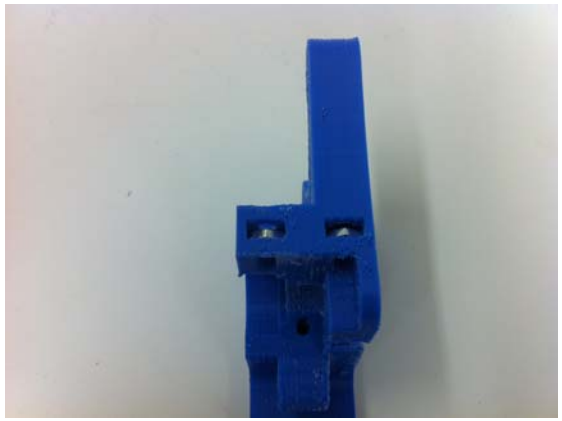
- Visegrip pliers
- Hot iron



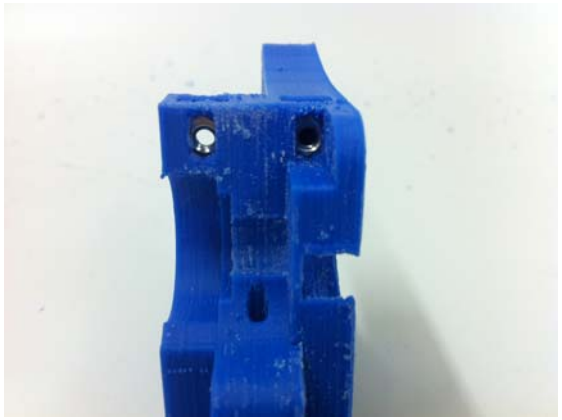
Insert 6-32 nuts in to the top slots of the extruder body.



Press the nuts in using the nose pliers as shown. If they are hard to get in use the hot iron to soften the plastic around it.



This is how it looks after the 2 nuts are inserted..



Make sure the holes 2 nuts inserted are aligned with the holes on the plastic part..

Insert hobbed screw into large gear

This is how the large gear should look now.

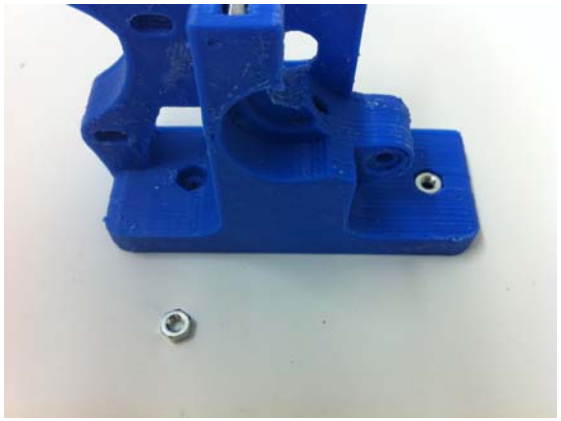
Step 9: extruder assembly (cont.)

Parts Needed:

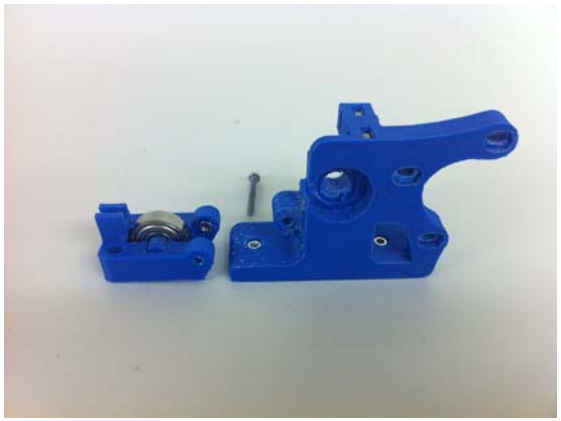
- Gregs-Wade-extruder
- Gregs-Wade-idler
- Bearing plastic spacer
- M3 Hex nuts (2 pcs)
- Ball bearing (2 pcs)
- M3 x 25mm screw

Tools Needed:

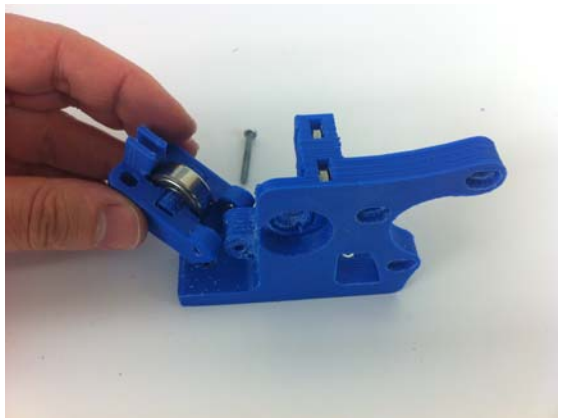
- Heat gun
- philips screwdriver



Take 2 of M3 hex nuts and the Gregs-wade-extruder. Insert the nuts on the base nut traps that are shown next to the nuts on the picture.

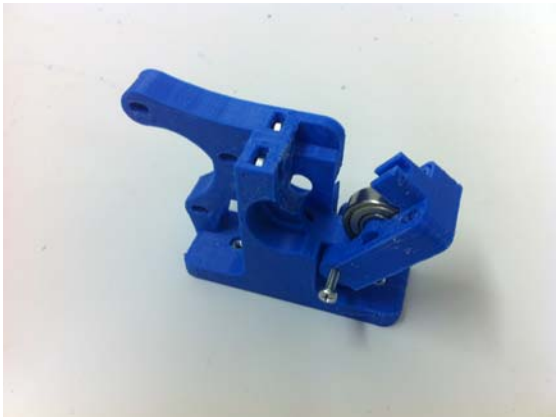


Position the idler and extruder parts as shown in the picture. We will assembly the idler into the extruder



Insert the idler into the hinge of the extruder body. Start on the side where the trapped nut is. Be carefull not to pop out the nut.

Once the idler is in position, proceed to screw-in the idler screw as shown in this and next pictures.



Make sure the screw is inserted in the proper direction. Should be inserted as shown here.

Locate two more of the ball bearings and the bearing spacer.

Step 10: extruder assembly (cont.)

Parts Needed:

- Gregs-wade-extruder assembly
- Gregs-wade-idler assembly
- Bearing plastic spacer
- Large Gear assembly
- Ball bearings (2 pcs)
- 5/16 washers (9 pcs)
- M8 hex nut (2 pcs)

Tools Needed:

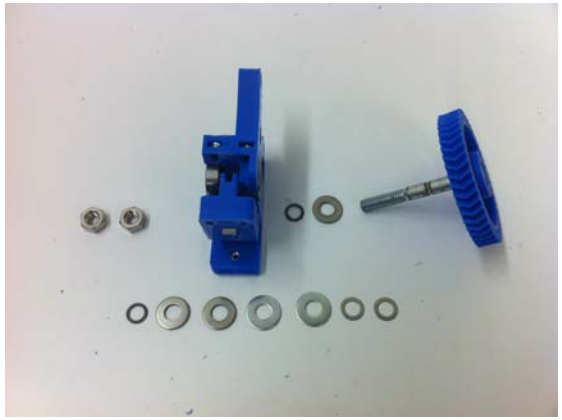
- Vise grip pliers

Insert the plastic bearing spacer as shown on the picture above

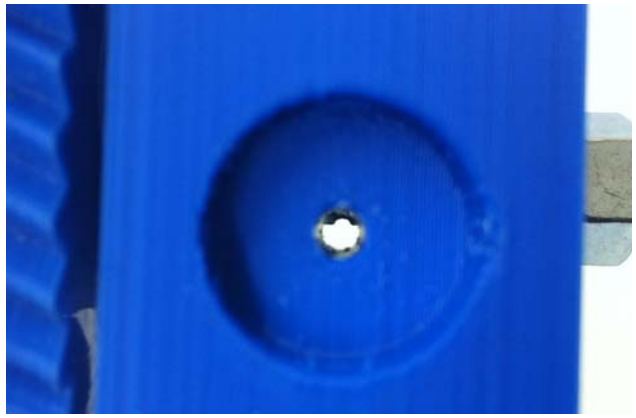
Press fit the plastic bearing spacer in position. Use the screw driver or file to push it ensure it goes all the way.

Press fit the ball bearing on top of the plastic bearing spacer.

Flip the assembly over and press fit the second ball bearing



Locate the following parts. Note the additional washers and shoulders of various thicknesses. You will have to find the right combination to align the grubs on the bolt with the filament hole.



Tighten the first M8 nut then use the second M8 nut to jam in position. After tightening you might notice the bolt gets miss aligned. This is normal as tightening pushed the bearings to final position. Re-align changing washers and tighten again.

Step 11: Extruder assembly (Cont.)

Parts Needed:

- Gregs-wade-extruder assembly
- 6-32 x 2” screws (2 pcs)
- 6-32 washers (4 pcs)
- springs
- Extruder motor
- small gear.
- M3 x 12 mm screws (3 pcs)

Tools Needed:

- Allen Key #1.5 (Metric))
- philips screwdriver

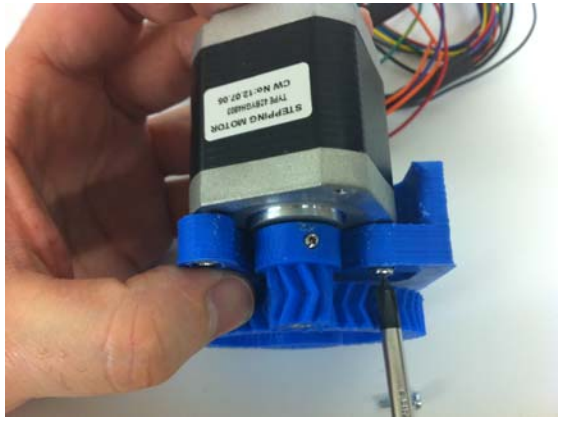
Locate the following items. Take the screw and insert the following: washer, spring, washer, idler, extruder.

Screw-in until it grabs the trapped nut on the extruder body. It should look like this.

Align the setscrew with the flat on the motor shaft. Insert the gear on the motor shaft. Keep the alignment of the setscrew with the flat in the shaft

Do not tight completely yet. Just enough so that it doesn’t rotate but still able to slide in and out

Use 3 screws to attach the motor as shown. Note the direction the wires are coming out of the motor. Do not tight completely yet.



Align the teeth on the gears by sliding in/out the small gear and slide the motor in all the way so that both gears are in full contact then tighten the motor screws.

Step 12: Extruder assembly (Cont.)

Parts Needed:

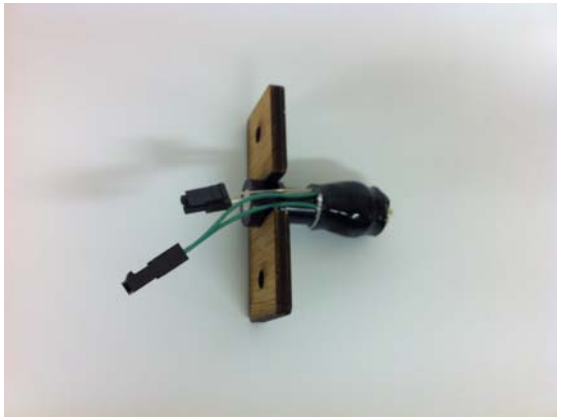
- Plate
- Hotend
- Extruder Assembly

Tools Needed:

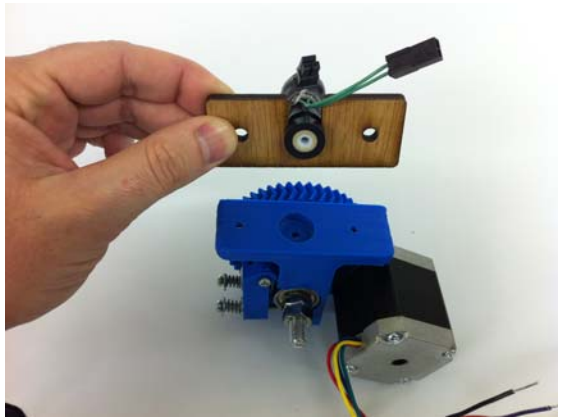
- Your Hands

Next, Tighten the setscrew on the small gear using the #1.5 Allen Key

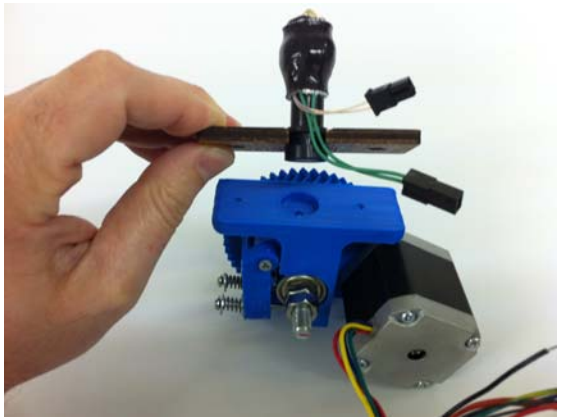
Locate the hot end tip and the mounting plate



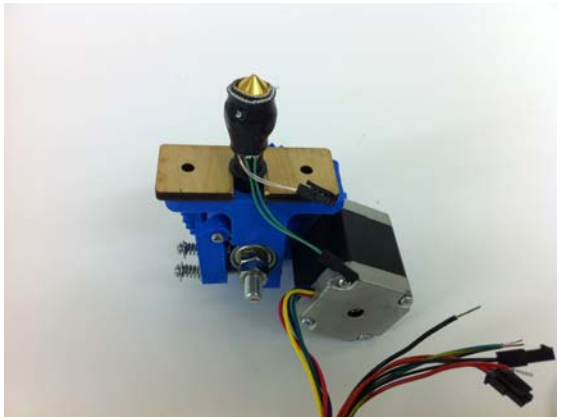
Slide the hot end into the mounting plate. Make sure the wires are facing the open end of the plate.



Flip over the extruder assembly and position the hot end assembly as shown.



Insert the hot end into the hole on the extruder. It should be a tight fit. If hard to get in try filing a little bit around the edge.



This is how it should look. Note the orientation of the hotend wires as well as the motor wires.

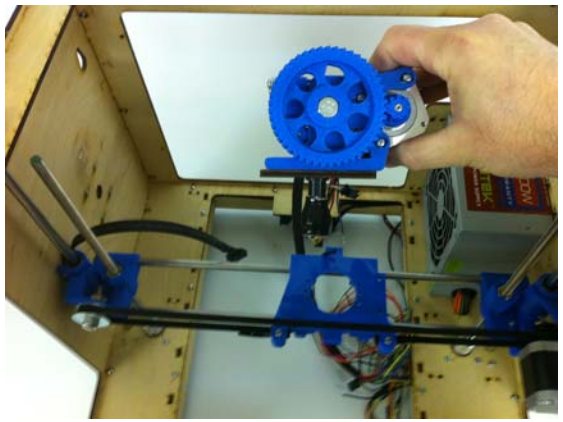
Step 13: Mounting the Extruder assembly

Parts Needed:

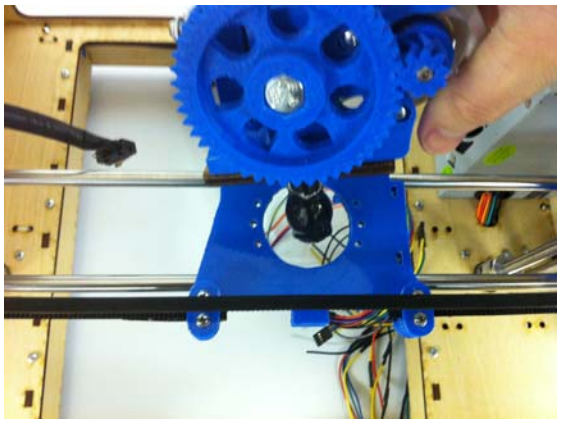
- Gregs-wade-extruder assembly
- Frame Assembly
- M3 x 20 mm screws (3 pcs)

Tools Needed:

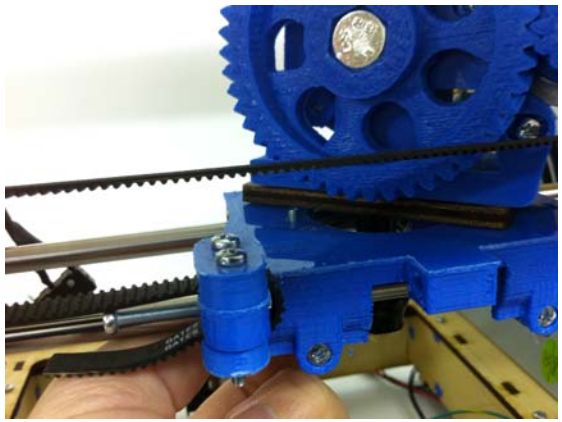
- philips screwdriver



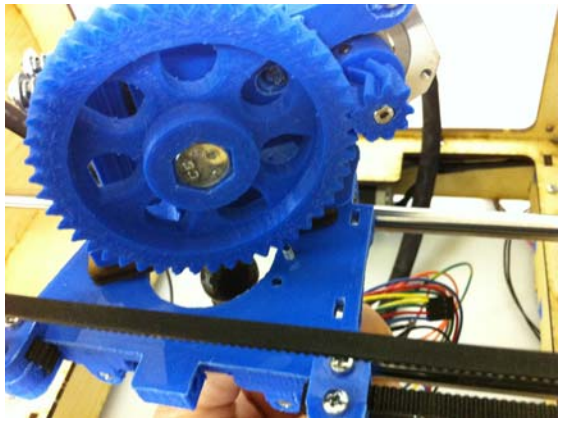
Take the extruder assembly and position it on top of the carriage.



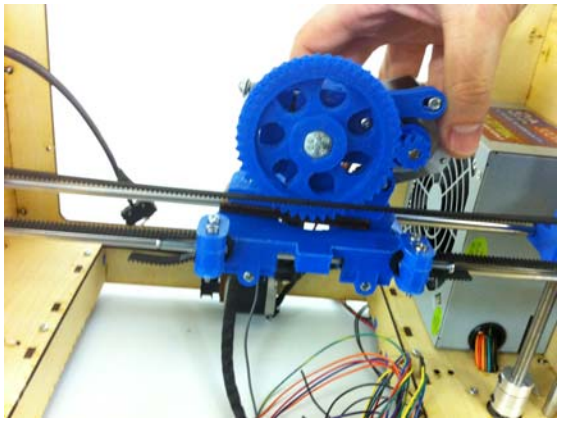
Make sure the hotend goes into the hole. Notice there are 3 small holes on each side of the carriage. You want to use the middle ones on next step.



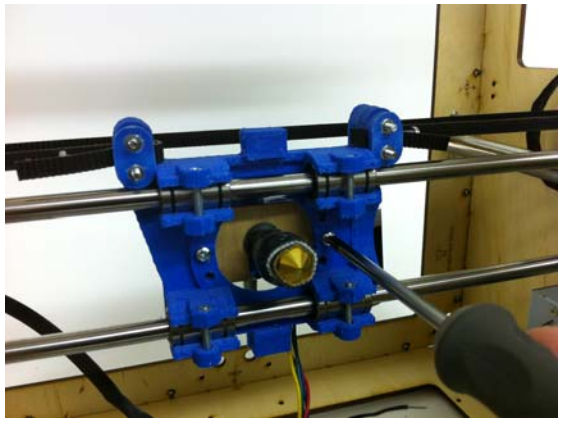
Insert an M3 x 20mm screw from below into the carriage hole, align the extuder and then screw in onto the M3 nut on the extruder base.



Insert a second M3 x 20mm screw from underneath on the other side.



Align the extruder over the second screw and screw in onto the M3 nut on the extruder base.



Next, Flip the Frame assembly over and finish tightening the 2 screws using a screwdriver.

Step 14: Installing the Fans.

NOTE: Repeat all the steps below for the second fan assembly.

Parts Needed:

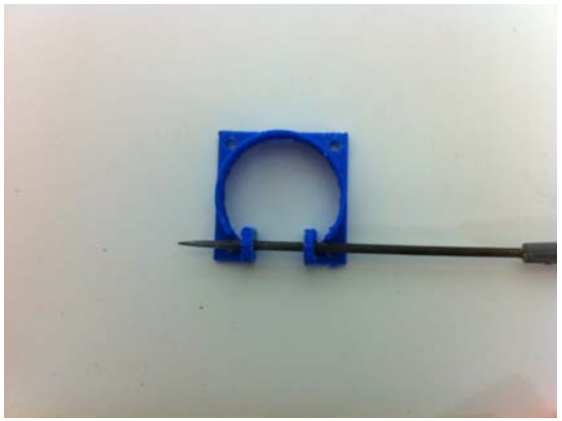
- Fan Holder (2 pcs)
- Fan (2 pcs)
- M3 Hex nuts (8 pcs)
- M3 x 12mm screws (4 pcs)

Tools Needed:

- philips screwdriver
- round file
- flat file

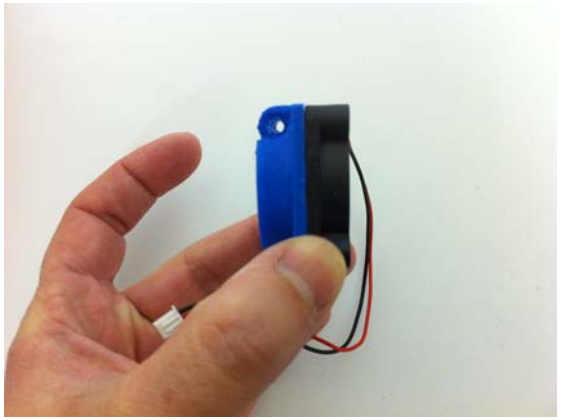
Use the Flat file to clean up the internal faces of the pivoting joint.

Use the round file to clean up the fan holes.

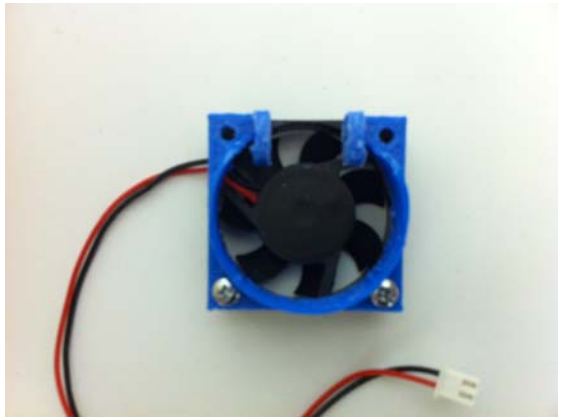


Use the round file to clean up the pivot holes.

Insert hex nuts into fan nut traps (4 pcs).



Place the fan on the place holder. Make sure the nuts on the fan are facing out.



Secure the fan in place using 2 M3x12mm screws as shown. Use the hoes opposite to the pivot point.

Step 15: Installing the Fans (cont.)

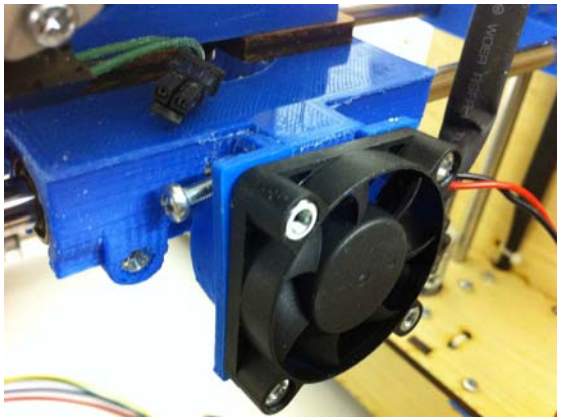
NOTE: Repeat the first 3 steps below for the second fan assembly.

Parts Needed:

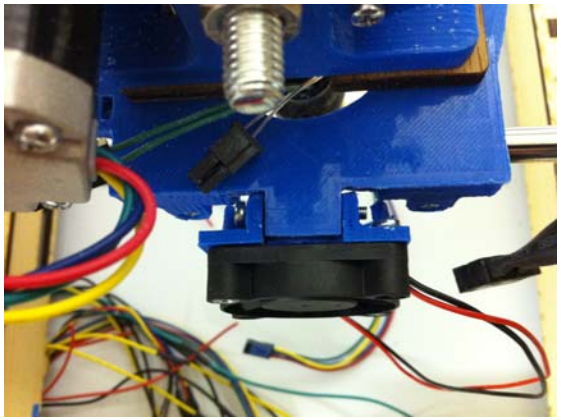
- Fan Assembly (2 pcs)
- M3 Hex nuts (2 pcs)
- M3 x 25mm screws (2 pcs)
- M3 x 12mm screws (4 pcs)
- Wire nuts (2 pcs)
- Zip Ties (2 pcs)

Tools Needed:

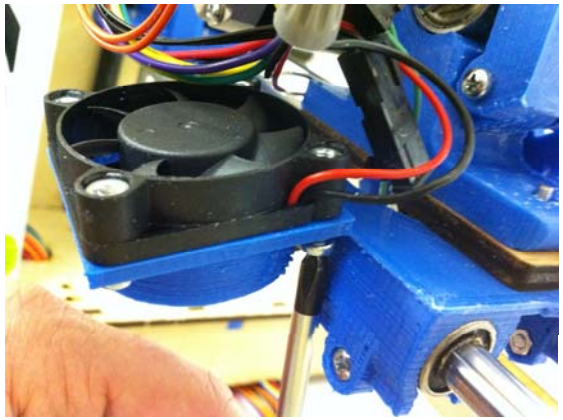
- philips screwdriver
- Nose pliers



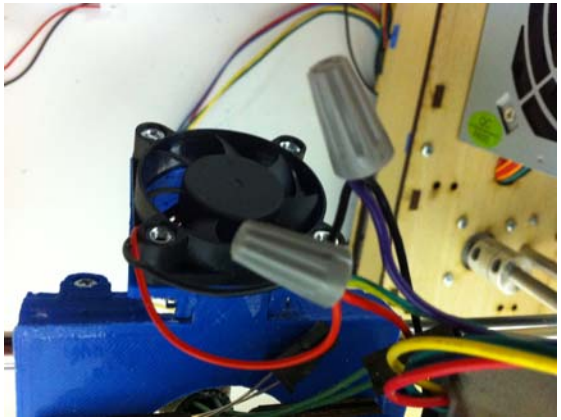
Inser the fan assembly as shown and slide in an M3 x 25mm into the pivot joint.



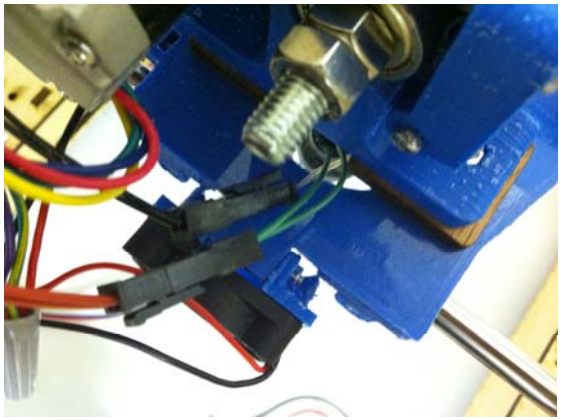
Secure the screw in place using an M3 Hex nut n the opposite side



Pivot the Fan assembly to the horizontal position and insert M3 x 12mm screws on the 2 remaining fan holes and tighten.



Use wire nuts (2 pcs) to join together the Fan wires (red/red to Green and black/black to Purple.



Connect the hotend wires. Green/Green to Red/Red and Translucent/translucent to black/black.

Route the wire harness thru the hole next to the power supply and secure with 2 zip ties as shown.