A Metal Polishing Jig

By Norm Berls
Why make a metal polishing jig

- Objective: polish small steel parts to a mirror-like finish.
- Silicon Carbide abrasive paper works well... under certain conditions.
- Paper needs to be stretched tight against a hard flat surface.
- Steel part needs to be held steady or rounded corners result.
About Silicon Carbide Abrasive Paper

• Needs to be wetted with water to work best.
• Available in grits from 80 to 5000.
• Abrasive paper comes in 9 X 11 inch sheets
Design goals and decisions

- Hold the abrasive paper so that it won’t slip.
- The holding clamp for the part must be movable to different parts of the abrasive paper.
- Jig will be 14 inches long and 7.5 inches wide.
- Jig will be a table top tool for hand polishing.
The Polishing Jig & Materials

- Brown: wood
- Blue: 1018
- Pink: Steel Alloy
- Yellow: Drill Rod
The back view
Wood Base

- Layers of plywood glued together.
- Held to edge of work table with C clamps.
Jig Base Fasteners

- Metal jig base fastens to wood base with allthread and hex nuts.
Jig base

- Cut slots for retaining abrasive paper.
- Abrasive paper drapes over center of table.
Clamping Shelves

- Shelf extensions on abrasive paper clamps fit into slots on jig base.
- Shelf extensions are smaller than the jig base slots.
- Custom turned thumb screws serve three purposes:
  1. Hold abrasive paper taught
  2. Keep abrasive paper from slipping
  3. Allow fresh part of abrasive paper to be moved into position.
Base Clamping Screws

- The thumb screws that clamp the shelves to the base are custom made.
- The small part is threaded to fit the jig base.
- The wider part forces the shelves into the base.
Clamping Shelves: an end view

- Shelf extensions fit into base slots and clamp abrasive paper into jig.
- The extensions reach deeper than the depth of the slots. This pinches the abrasive paper.
- It also leaves a little free room between the extensions and the base where the abrasive paper hangs down.
Clamp Assembly

- SHCS’s hold face at appropriate distance from base.
- Custom thumb screw forces face towards base by screwing into base.
- Clamp rides on two vertical drill rods.
- Clamp and work piece can be easily removed from jig just by lifting them up... they are not fastened on... but the large thumb screw has to be completely removed to do this.
Clamp Assembly: an edge view

- Left side of custom thumb screw barrel has a larger diameter than the right side.
- Right side is threaded.
- Workpiece is held at the very bottom of the clamp.
Two Fasteners

- SHCS hold hand pad assembly to workpiece clamp.
Palm Block.

- The polishing jig is a hand powered tool.
- Metal extension sits on top of workpiece clamp.
- Wood cap sits on top of extension.
- Wood cap allows easy pushing of workpiece against abrasive paper.
Two Assemblies

- Workpiece clamp mounts on slider assembly.
Horizontal Slide Assembly

- Vertical pins for the clamp assembly are not fastened together.
- Different sized clamp assemblies can be made and fitted by moving the vertical pins further apart.
- Different clamp assemblies can accommodate things like “V block” clamps for holding round workpieces.
- Vertical pin holders slide back and forth along the horizontal drill rods.
Horizontal Slide Assembly: bottom view

- Note the small pins sticking out of the horizontal slide assembly.
- These fit into the jig base and allow the whole horizontal slide assembly to be moved to different positions on the jig base.
- This allows the jig to make use of unused parts of the abrasive paper.
Jig Base: closeup

- Note the row of holes in this closeup of the jig base.
- The pins from the horizontal slide assembly fit into these holes.
- The horizontal slide assembly is not fastened to the jig base.
- It can be picked up and moved at will.
One More Thing

- The horizontal drill rods are silver soldered into the right end block of the horizontal slide assembly.
- These same drill rods are simply inserted into the left end block and can be pulled out easily.
- This potentially allows a different set of vertical slide pins to be fitted to the jig.
- The vertical pins are silver soldered into the horizontal sliders.
The End