

Build Your Own
Woodworking Clamps

Intro: Woodworking clamps

This may be a little difficult for newest of woodworkers, but for those that passed high-school shop class with a B average this shouldn't be hard. This is a great project for anyone who wants to upgrade their shop on a budget, or just wants to enlarge their clamp collection without making another trip to Home Depot. All of the hardware is standard size and can be scaled up for larger clamps, so make an entire set! I'll post the measurements for the larger clamps at the end of this

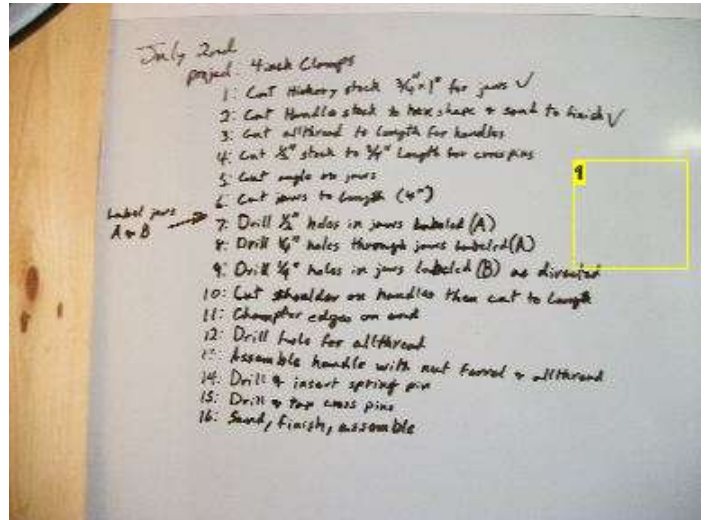
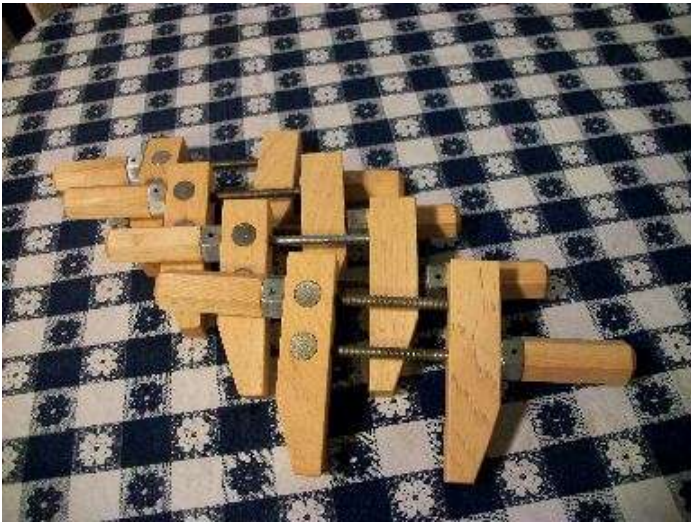


Image Notes

1. My "War-Board".

Step 1: A note from the maker

I know that I might have more specialized equipment than some people out there, but don't let that discourage you! There is always more than one way to solve any problem out there and just because I say that you need something does not automatically make it true. There is a lot of room for improvement here. I went through 3 prototypes before I finally got this far and it is by no means perfect. Feel free to experiment and make it your own, and above all else don't be afraid to fail.

Step 2: Materials

For this project I'm making a set of four, but I'll list the materials as if I were making one. Just multiply by the number you're making to get what you'll need.

Tight grained hardwood planed 3/4 inch thick at least 1 inch wide (I used hickory)
1/2 inch steel rod
1/4 inch 20 all-thread
1/2 inch nuts x2
3/32 spring pins 3/4 inch long x2

You will also need a 1/4 inch 20 tap for the barrel nuts, and a 13/64 tap drill

Step 3: Rip it.

The best way I've found to make something is to make all of the parts you need all at once in one operation. So to start, rip the material you need for the jaws and the handles at the same time. The handles will start out 3/4 by 3/4 square, and the jaws will be 1 by 3/4.

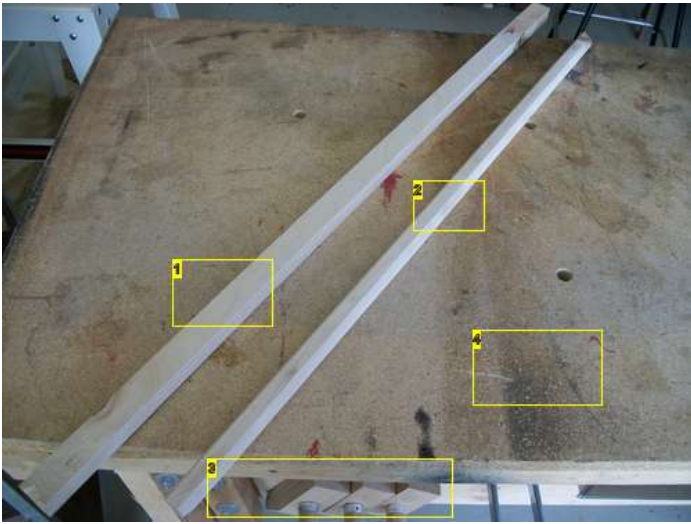
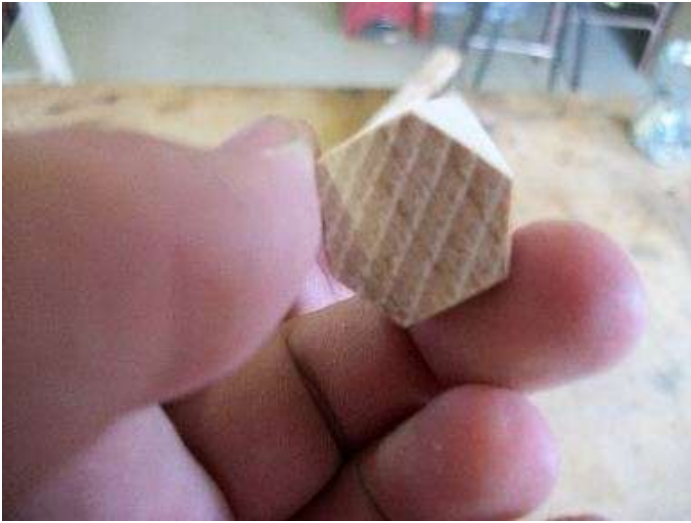


Image Notes

1. this piece will become the jaws
2. This is the clamp handle stock after being cut into a hex shape.
3. failed clamps
4. Yes the workbench is handmade too. Maybe I'll post the instructions for it someday.

Step 4: Cutting the handles

Set what ever machine you got to 33 degrees to cut the handle stock to shape. You can use the 1/2 inch nut as a spacer to get the thickness right. I used my nifty little bandsaw to do the work and it came out nicely. Just run it through on one side, flip end for end and make second cut. This will give you one side of the hex shape you are cutting. Then cut the other side the same way. It'll make more sense when you're doing it than it does in print. Trust me. Once thats done go ahead and set your machine back to 90 degrees and cut the handle stock into 2 1/2 inch lengths.





Step 5: Jaw blanks

Now cut the angle on the jaws. You can cut them any way you like. I cut mine a little long then used this jig to cut a 15 degree angle on one side. The rise and run are 2 inches by 2 3/4 for those of you that like to use a framing square, and is set up 1/2 inch or dead center in the 1 inch stock. I recommend cutting the angle first then cutting the jaws to 4 inches just you have a little room for error.

Once all this is done label half of the jaws that you made A and the other half B.

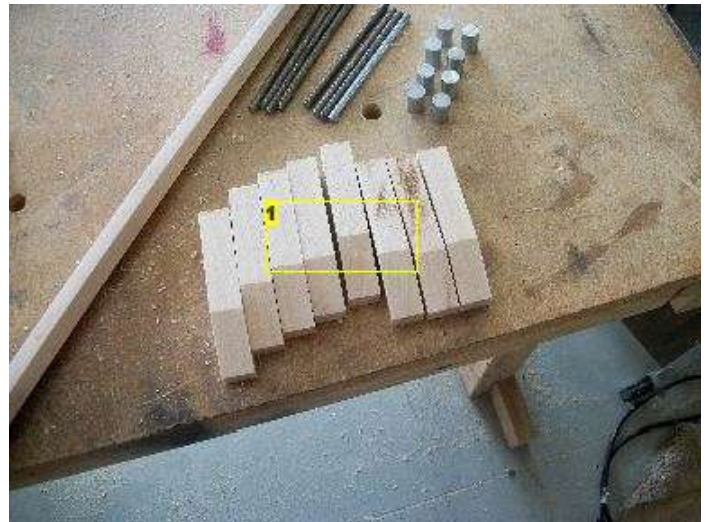


Image Notes

1. finished jaw blanks label A and B

Step 6: Drilling Jaw A

Starting with Jaw A you will need to drill two 1/2 inch holes through one side and two 1/4 inch holes through the top.

The first 1/2 inch hole is 3/4 of an inch from the back and is dead center in the jaw blank. The second one is 1 3/4 inches from the back of Jaw A. The two 1/4 inch holes are set in the center of the top of the jaw 3/8 of an inch from each side and intersect the centers of the 1/2 inch holes.

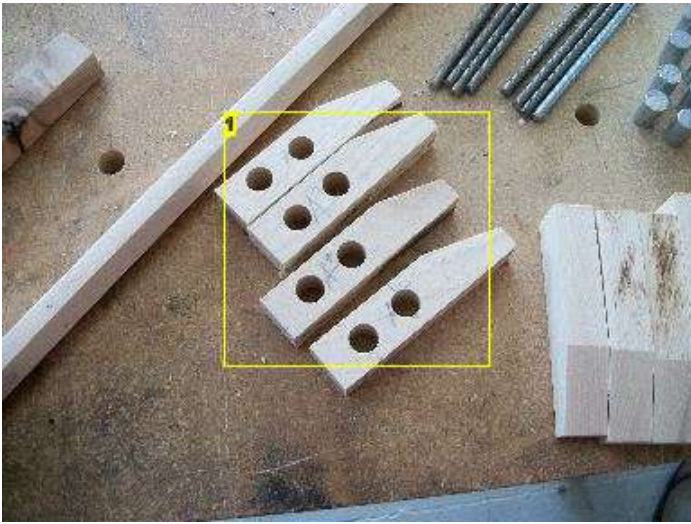


Image Notes

1. Finished A jaws.

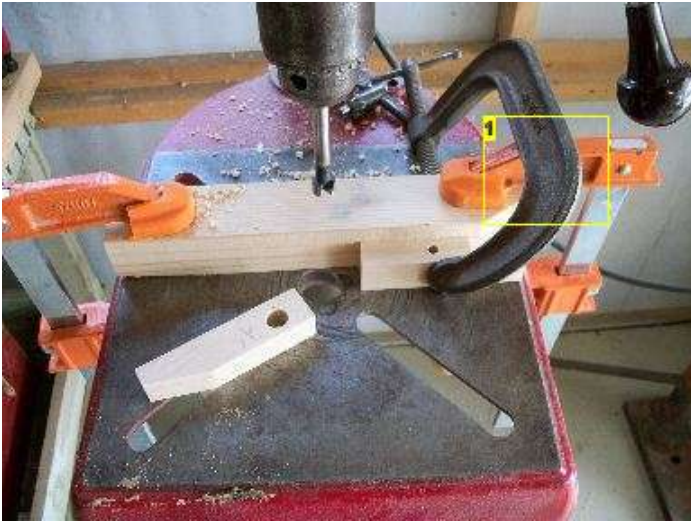


Image Notes

1. It takes a village.

Step 7: Jaw B

Jaw B is quite a bit different than Jaw A. It has no 1/2 inch holes drilled in it and the 1/4 inch hole in the rear is only 1/2 an inch deep. Set up like you did for Jaw A, drill 1/4 inch holes 3/4 and 1 3/4 from the back. Be careful not to drill all the way through on the rear hole like I did. That's why I started labeling them A and B. It's a real pain to have to go back and redo something just because you weren't paying attention.

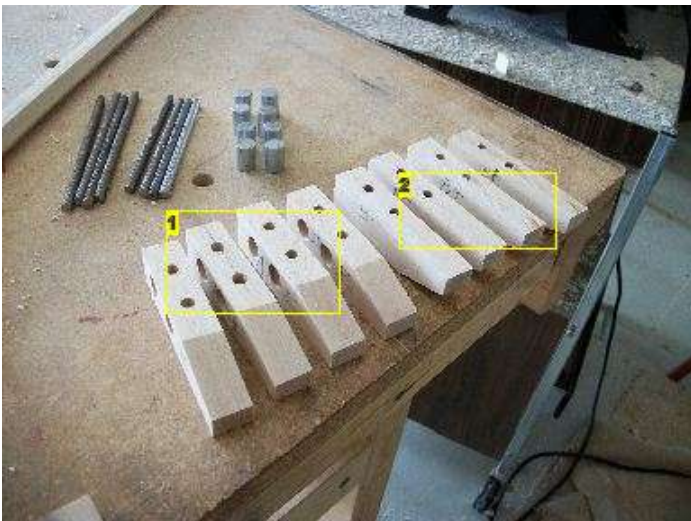


Image Notes

1. Jaw A
2. Jaw B

Step 8: Allthread

Get a good hack saw and cut the 1/4 inch all-thread to length. You will need a 4 1/2 inch piece and a 5 inch piece for each clamp you are making. Just set them aside for now and we'll come back to them later when we finish up the handles.

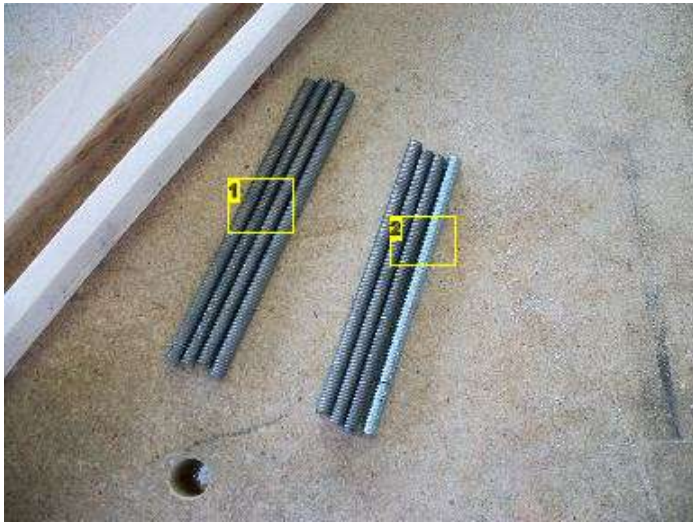


Image Notes

1. 5 inch
2. 4 1/2 inch

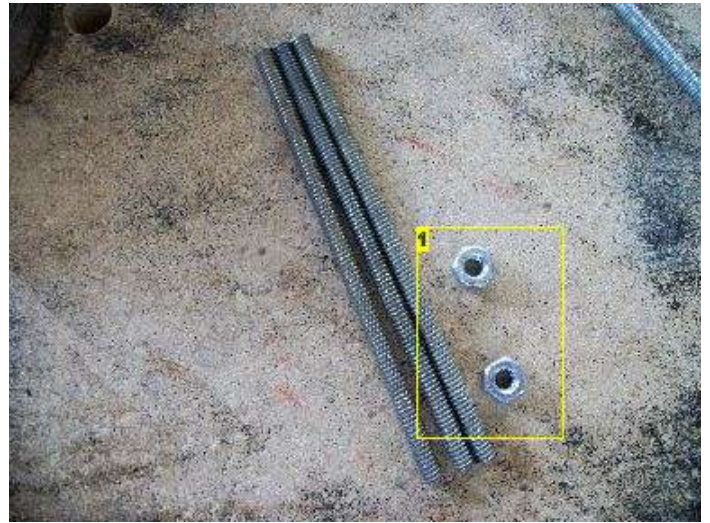


Image Notes

1. Use 1/4 inch nuts to remove burr after cutting the all-thread to length.

Step 9: Barrel nuts

Barrel nuts are a round piece of steel drilled and tapped at a 90 degrees through it. I made mine by cutting the 1/2 inch round stock into 3/4 inch blanks then drilling and tapping with a 1/4 inch 20 tap.



Image Notes

1. Barrel nuts before Drilling and tapping.

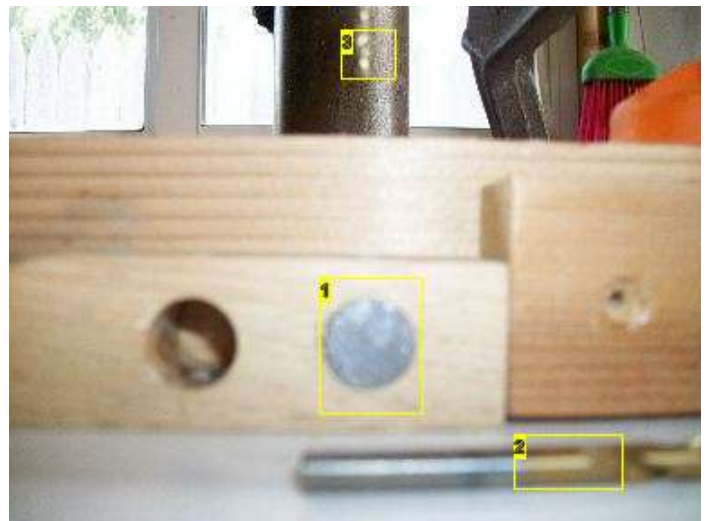


Image Notes

1. Barrel nut set up in scrap A jaw, ready to be drilled and tapped.
2. Tap drill.
3. Relief drill.

Step 10: The handles Chamfering the ends.

All of my handles have a chamfer cut on one end. It makes them look nice, removes the sharp edges, makes them easier to hold.

If you have a steady hand, the fastest way to get the job done is with a sharp chisel. Just clamp up the handles as shown and carve the faces down 1/8th of an inch.

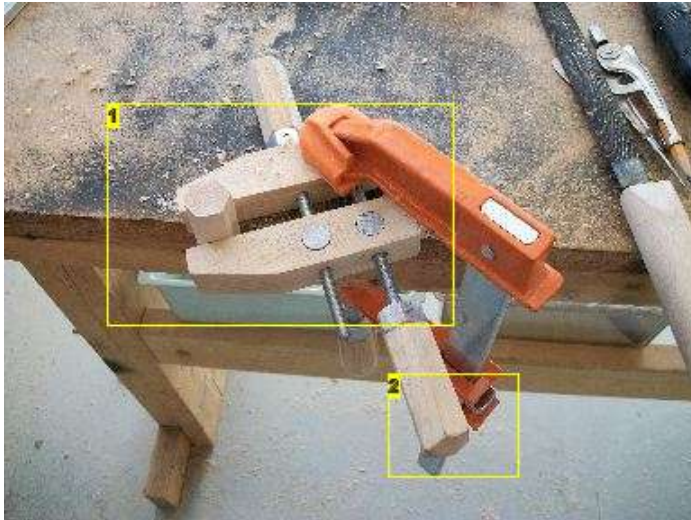


Image Notes

1. Clamp up.
2. 1st four inch clamp I made. Just a few bugs to work out, but it works!

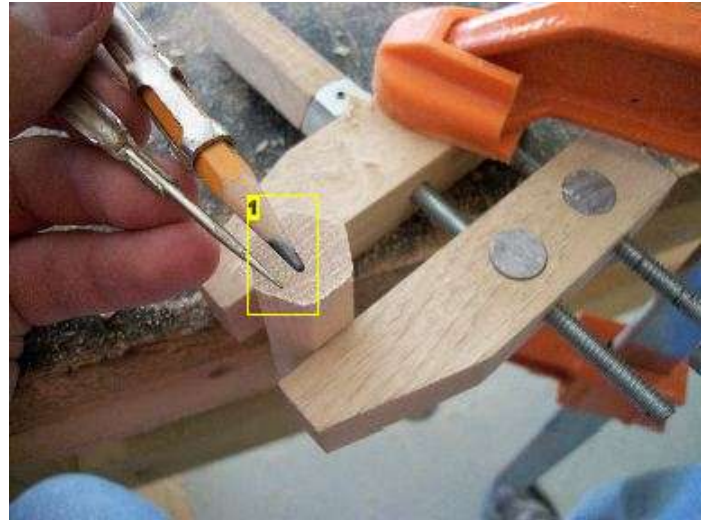


Image Notes

1. Set to 1/8.

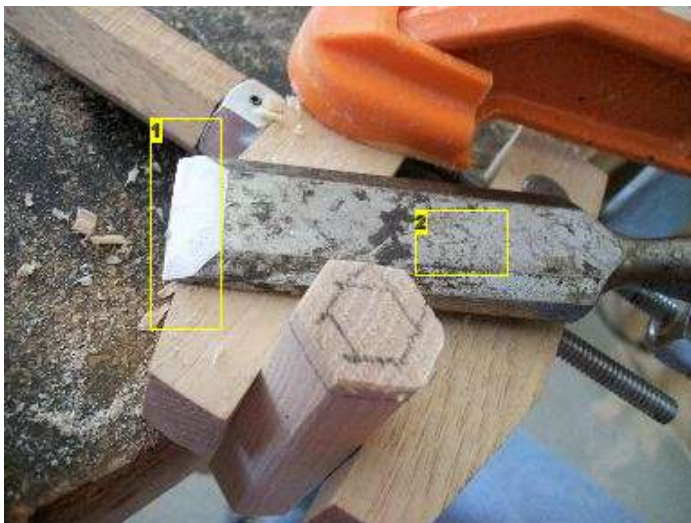


Image Notes

1. Some of my tools may look beat up, but trust me the business end is more than ready for the job.
2. My chisel isn't old. "It's experienced".

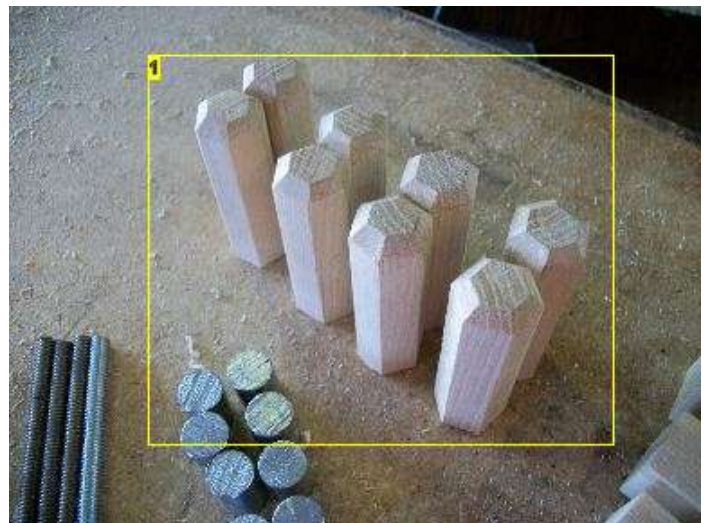


Image Notes

1. Ta-da! There you have it, 8 handles ready to go.

Step 11: Handles continued

For the handles to accept the 1/2 inch nut ferrel, it needs to be cut down to a diameter just a little larger than the hole itself so the threads will dig into the wood and help hold it in place. This is where a wood turning lathe would come in handy, but since I don't have one I'll have to make do without.

Clamp a stop block to the band saw fence and use a 1/2 inch nut to set up the depth of cut and the distance from the fence. Take a piece of scrap wood and run it through this step, then take it through the next one to make sure you have the saw blade set to the right distance from the fence so forth.

Now you're ready to cut the handles for real. Cut all the ends to depth making a nice little Jewish symbol on the end. Now reset the fence and stop block. Then saw off the little tabs.

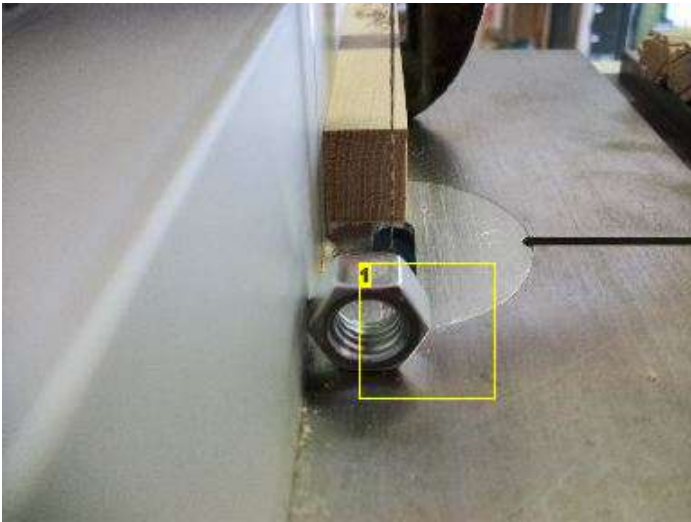


Image Notes

1. Eyeball this to get the right thickness.

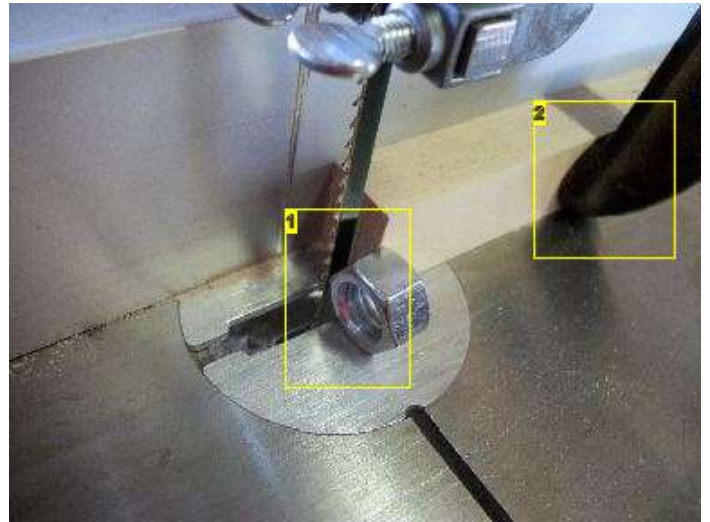


Image Notes

1. The band saw teeth should line up with the edge of the 1/2 inch nut.
2. C-clamp. "Yet again, it takes a village".

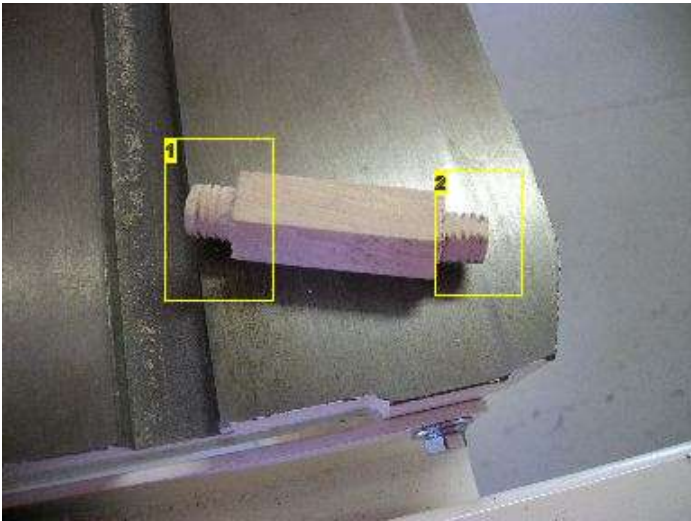


Image Notes

1. Go. After rounding the edges it fit on nice and tight.
2. No go. The end was cut too small for the threads to grip into.

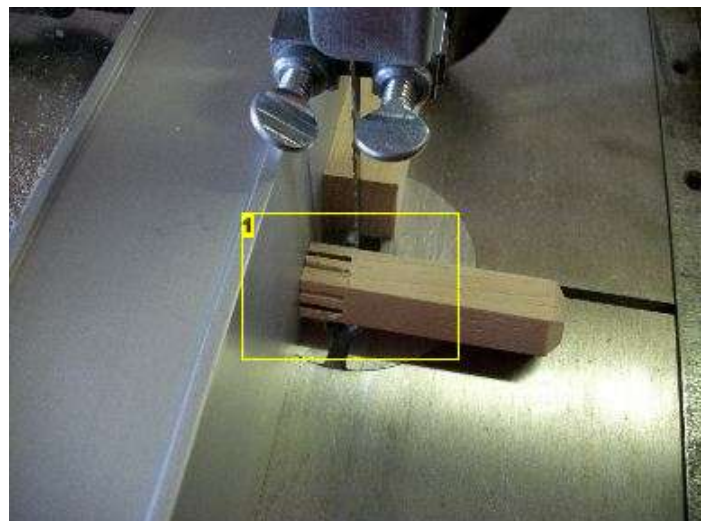
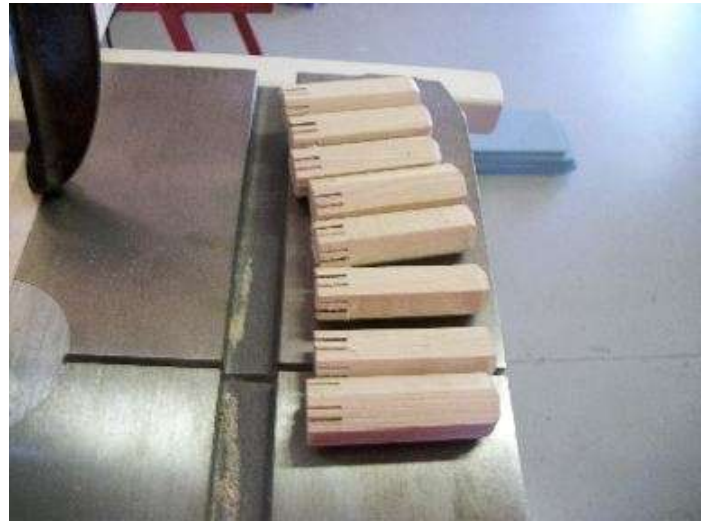


Image Notes

1. Its time to cut it to a rough diameter.

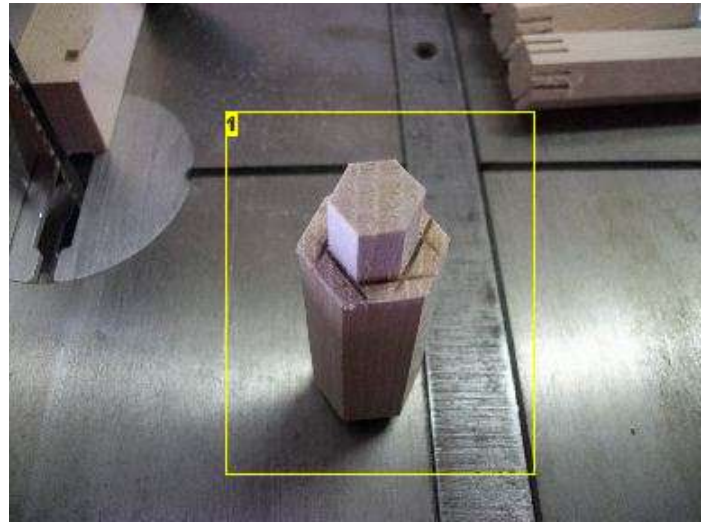


Image Notes

1. One step closer to completion.

Step 12: Handles, Knocking off the corners.

The 1/2 inch nuts won't fit on the handles without taking the corners off of them. Hopefully you tested this step with a piece of scrap wood before you got to your actual handles.

Set up your handles in a vise of some sort, then file the corners off of the top until its perfectly round.

Thats it, thats all you need to do. Now just twist the nut onto the handle. If its a little tight file a little more, but be careful. Its easy to remove material, but its real tricky to put it back on.

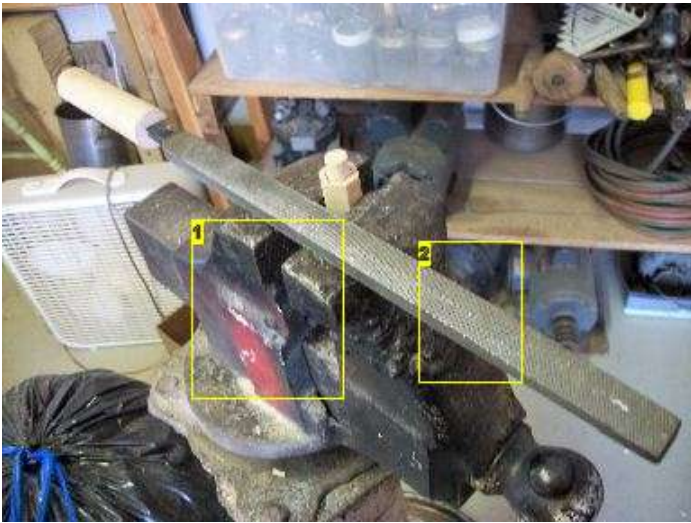


Image Notes

1. Metal vise... Not the best option, but I'll make it work.

2. This file has one "safe" edge with no teeth. Real hard to find now adays, but it makes a job like this a lot simpler.

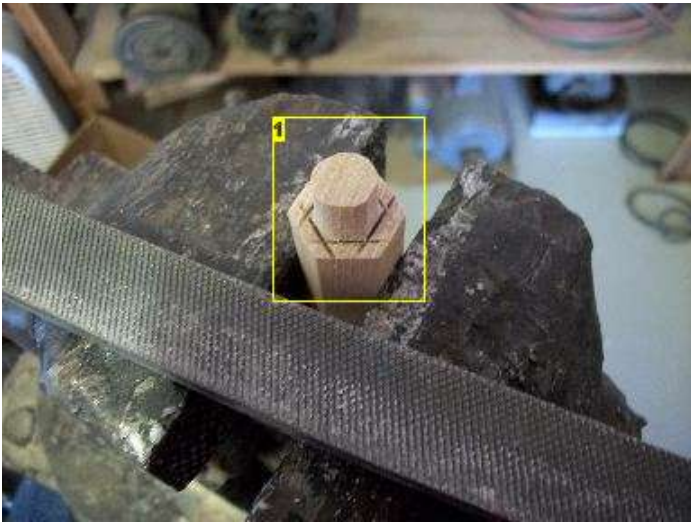


Image Notes

1. Ready for the ferrel.

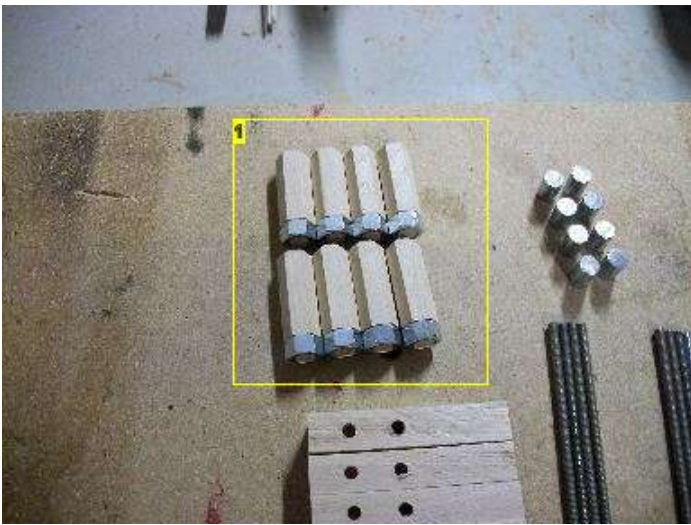


Image Notes

1. Handles with ferrels.

Step 13: Finishing up the handles.

Screw on two 1/4 inch nuts and tighten them into each other to keep the all-thread from moving in the vise. Then round the end with a metal file so that the handle will go in smoothly. Make sure there is at least one inch of material sticking out of the vise then screw the wood handle on by hand as far as possible. Use a wrench to tighten down to the base and line up with the handle. Don't over tighten, get the nut down as far as it will go then line it up with the handle. You shouldn't have a problem with stripping the threads, the wood is pretty forgiving.

The last thing you need to do is put the pin in the handle. Drill a 3/32 hole through the center of the nut, through the all-thread and everything, and drive in the pin with a hammer.

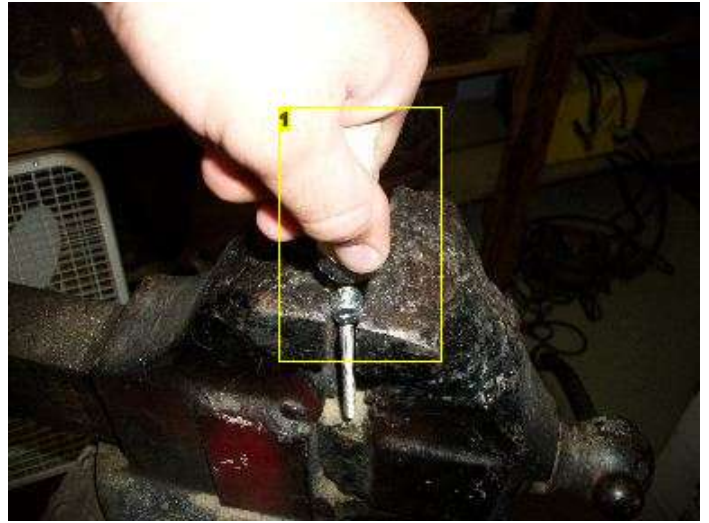


Image Notes
1. Screw in handle by hand.



Image Notes
1. Tighten with a wrench.



Image Notes
1. Finished handle in vise.

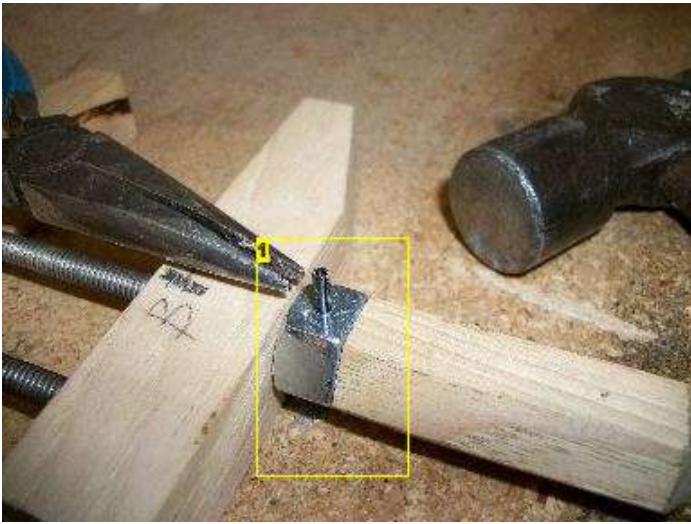


Image Notes

1. Making it permanent.

Step 14: Prologue

Well thats it. You have all the pieces made. Now just fit them together to make sure they all get along together, and you're finished. The only thing left to do now is sand them down, knock off the sharp corners, and add a coat of finish. Thats probably the easiest and most enjoyable step for me.

Put on a pair of rubber gloves and rub in a little linseed oil and finish up with a little beeswax and enjoy!



Step 15: Make it BIGGER!

I already did the math for you, so if you're wondering "how do I make bigger clamps than this?" here you go.

	4inch	6inch	8inch	10inch	12inch
Steel rod	1/2"	3/4"	1"	1 1/4"	1 1/2"
All-thread	1/4"-20	3/8-16	1/2-13	5/8-?	3/4-?
Max Opening	2"	3"	4"	5"	6"
Jaw Length	4"	6"	8"	10"	12"
Jaw Width	3/4"	1 1/8"	1 1/2"	1 7/8"	2 1/4"
Jaw Height	1"	1 1/2"	2"	2 1/2"	3"
Distance between hole centers:					
	1"	1 1/2"	2"	2 1/2"	3"
Handles:					
All-thread lengths					
	5"	7"	9"	11"	13"
	4 1/2"	6 1/4"	8"	9 3/4"	11 1/2"

Ferrel For the ferrels I used nuts that have a width from side to side that is the same as the thickness of the clamp jaws. For the 4inch clamps that happens to be the 1/2-13 nut.