Home Made Scroll Saw

By Michael Martin

Well, Here it is. The first part of the home made scroll saw. Now, I can't claim credit for the invention or the idea, but I will share with you my design and leave you to improve where you will. (There's plenty of room for that!). As you see it right now, it is fully functional except for the blade holders. What you see for a blade is just a piece of wire holding the arms so I can work on the power drive. By the time I get done, it all may look different from the picture. I've already changed the big ugly tension knob.

First of all, I'm assuming that you can figure out where to put the fasteners (screws and such) so none of that is marked on the prints. I have, however, tried to mark all the pertinent holes for the bolt together parts, such as the arms. I used all ¼" and 5/16" bolts of varying lengths, but feel free to use a bigger bolt in place of them.

The saw itself is built completely of hardwoods. The arms are Beech, the arm holders are Hard Maple, and the rest is Oak. The legs are made of 2x4 pine. (Who's gonna know?) You could probably build it all out of pine, but I would stick with hardwood for the arms and arm holders. Mainly because of the tension and rubbing while in motion. When I varnish it, I plan to give the arm holders a liberal coat of heavy wax on the inside to keep from starting a fire. I might mention that all of the wood unless marked otherwise is ¾" in thickness.

The power train is an old 20" rear bicycle tire and assembly. It's the kind that when you back pedal, it brakes. I just removed the brakes so it would free wheel. I have found that there is not enough mass to keep the saw going, and you have to pump constantly. To

remedy that, I was going to get some of those heavy bolt together fishing weights and affix them to the spokes, which I may still do, but I am working on a different assembly for power. Something more concrete.

Partial Assembly View

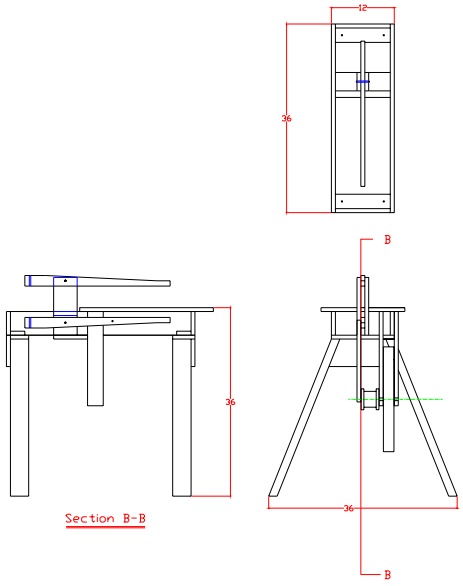

Fig. 1 ***Overview***

Note that the wheel pictured is *not* the bicycle tire. This is the new wheel I'm working on. Nothing else will be changed on the saw itself, so, it can be constructed as planned. I will include the plans for the tire also later on.

Main Body Assembly

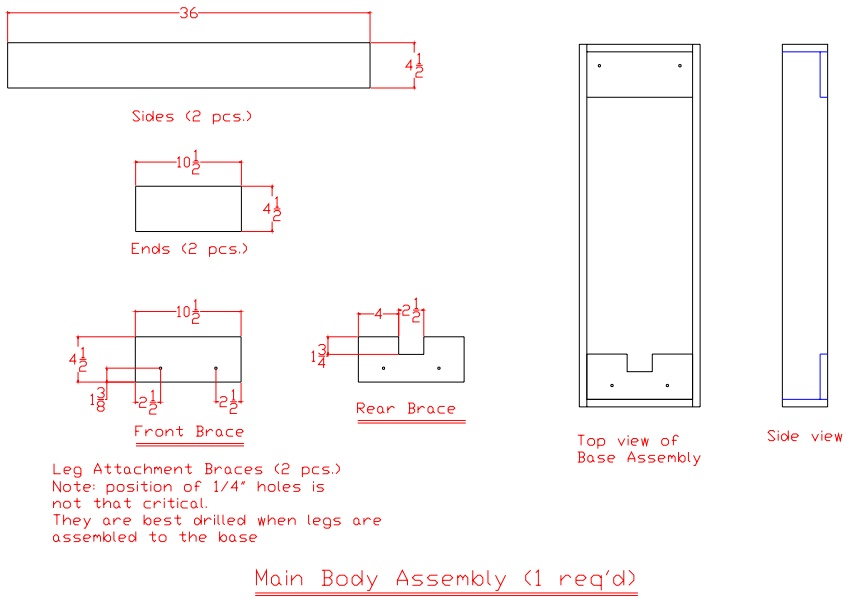

Fig. 2 *Main Body*

This is the main frame of the saw. It is all ¾” stock. If all the stock is cut true and square when it’s cut, the assembly will pretty well square itself. But to be on the safe side, check it with a framing square or other small square. I cut out all the pieces and laid them out on bar clamps. Then I glued each joint together and clamped them in position, tapping all the parts flush, and checking for square before tightening. After the glue has set, overnight preferably, I drilled and countersunk for #8 by 1 ½” long screws. Then glued in some plugs and cut flush to the frame. Note that the rear brace has a cutout. This is clearance for the lower arm. It may not be needed, but I felt safer in doing it.

Fig 3. *Detail of Main Body Corner*

Leg Set

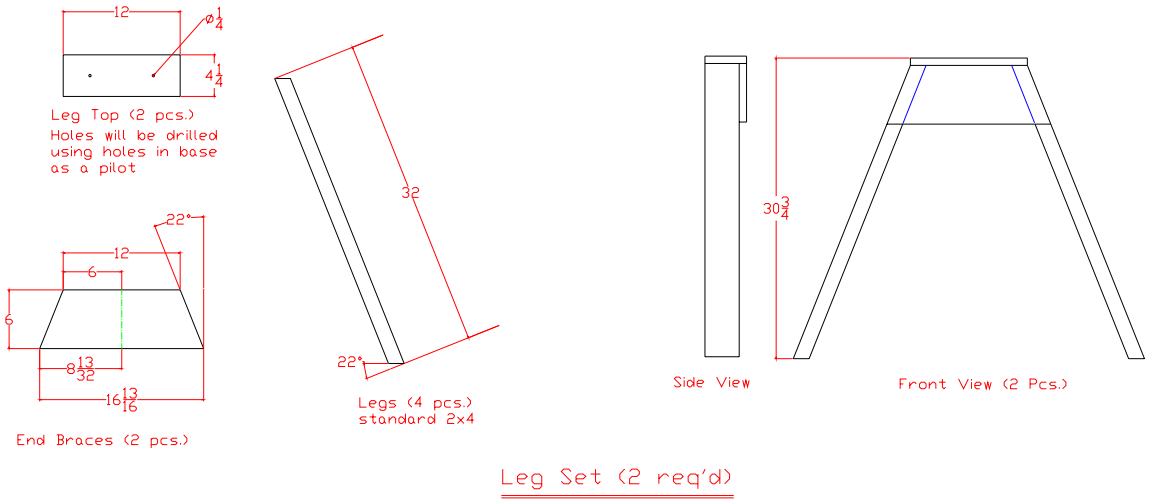

Fig 4. ***Legs***

Only the legs are 2x4's the rest is of ¾" oak. These are glued and screwed together. I used Titebond 2 glue. It hasn't let me down yet. Since these should match up with the braces on the main body, you might ask if one of them should be notched also? On these it is not needed. You will have a ¾" offset when you attach them, and the arm should never reach that low. My attachment procedure was to set the legs up, and put the Main Body on top of them. After lining up flush with the ends, I C-clamped them in position and drilled two ¼" mounting holes making sure that they cleared everything. Feel free to change the location to suit. They are then bolted in place with two ¼" x 2 ½" bolts, washers, and nuts. This allows me to break it down to transport to the craft shows. (The screw holes in the front will be plugged later. Also, the knee breaker eyebolt sticking out the front will be recessed).

Fig. 5 ***Detail of legs***

Upper and Lower Arms

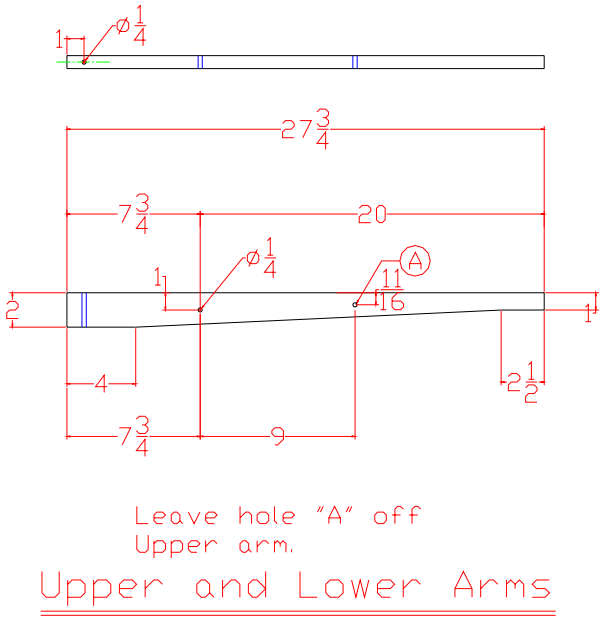

Fig.6 ***Arms***

The arms are made of Beech. This was only because I had a piece and wanted to use it. It could have easily been Oak or Maple, or another hardwood. I would hesitate to use pine here. The arms need to be straight and solid. The upper arm is the same only without hole "A". Hole "A" is where I mounted my drive link. Again, this is not written in stone. You may play around with the location and link length, and maybe come up with something better. On my arms, I glued a ¾"x2"x2" block on both sides for a little extra mass. (See Fig. 7). The plan was to thread a ¼" x 6" eyebolt thru it, but my hardware store didn't carry it and I had to opt with a 5/16" x 6". This made me a little skeptical of the wall thickness, so I built it up. I like a nice solid part, especially if it's going to be knocking about. Note the knob on top has been changed. This one isn't as overpowering to the eye.

The arms are held together by the two eyebolts connected with a stiff spring. I'm sorry I can't tell you where to get the spring, because it came from one of my junk boxes. Again, nothing's written in stone. You may have to raid your own junk box to find a compatible spring. The reason I used 6" eyebolts was for the adjustment, and differing lengths of springs I had. I decided on this one. It is about 5/8" diameter and 3 ½" long and stiffer than week old road kill! The two main purposes are to allow the arms to pivot and provide a softer tension on the blade.

Fig. 7 ***Arm Assembly***

Arm Holder

The arm holder uprights are made of Hard Maple. These I did not glue in. I am thinking of recessing bearings and a spacer on the inside for less friction. And, possibly a wear plate later on after I see how much damage the rubbing is going to cause. The ¼" bolts should be snug, but loose enough for the arms to move freely. Use a nylon lock nut so the vibration will not loosen it. All moving parts should have the nylon lock nut. Fig. 7 and Fig. 8 should give you an idea how it is put together.

Fig. 8 ***Arm Holder***

The bottom board fits *underneath* the base and is screwed from the bottom. The sides shown in the drawing are the actual sides of the base, not an extra board I forgot to draw.

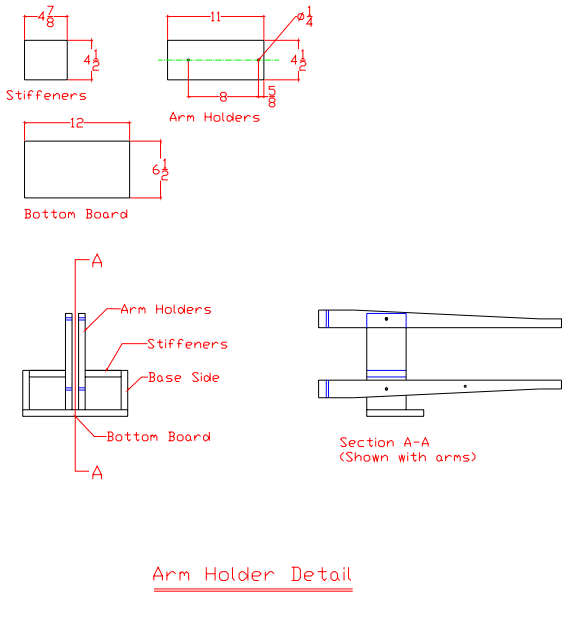

Fig. 9 ***Arm Holder Assembly***

Table Top

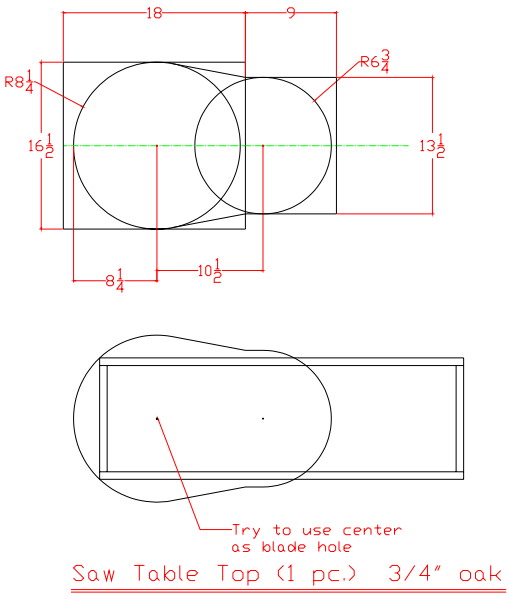

Fig. 10 ***Table Top***

The table is made from four 4 ½" x 16 ½" boards and two 4 ½" x 13 ½" boards glued together. The top drawing shows the orientation. I used a trammel center to draw the circles, and band sawed it out. Then routed the top and bottom edges with a round over bit. I only put a very tiny hole in the center to run the wire thru. When the blade holders are done, I will then make a cut out for it at the exact location. It looks like it's going to be pretty close to center.

Blade Holders

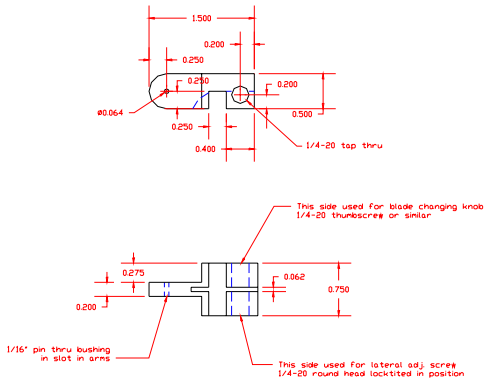

Fig. 11 ***Blade Holders***

So far, this is what I've come up with for blade holders. This print is in decimal because I have to make it in the machine shop. I plan on using a piece of square steel and milling it to size. The hole thru will be for a ¼"-20 screw on one side and a ¼"-20 thumbscrew on the other to capture a 5" pinless blade. That should give me a bit of lateral movement if I need it. I will then slot the end of the arms and pin them in with a spring pin. Being a parallel arm saw, the blade holders must pivot with the arm motion. That will give a straight up and down path to the blade.

This is the end of part 1. These plans will take you thru building the main part of the saw. Part 2 will be the power drive, both the bike wheel and the concrete one I am designing now. If you have any questions, or comments, design changes or gripes about the weather, please e-mail me at:

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Mike