# Build the Steel Snake hollowing tool
## By Capt. Eddie Castelin

(Disclaimer: This tool may resemble a tool already on the market and probably patented. I have not seen such a tool in detail, taken any measurements or am privy to any patents on this product. To copy and sell such a tool may infringe on patents held by others.)

1. To construct this tool I used 1" mild steel solid stock I purchase from a local steel supplier in a 20' length for about $40.00. There is enough material in one length to make more than 6 tools. I also use a piece of 3" X ¼" flat plate (I would have rather a piece of 3/8" or ½" plate to make the bracket.) I also use a piece of 1-1/2" X ¼" plate for the base anchor bolt. The bolt is a ½" X 2-1/2" machine bolt with a flat washer and regular nut. You will also need 3/8" machine bolts, flat washers, plastic washers and nylon insert lock nuts to complete the assembly. To create a tool holder for Ellsworth or Sorby type tools you will need a piece of ½" interior (3/4" exterior) square tubing about 12" long.
   **Typical Parts list:**
   a. 1" solid square stock (hollow stock will not work as well)
      i. 12" in length
      ii. 8" in length
      iii. 14" in length
      iv. 1" in length
         1. All with square cuts, sanded and corners softened.
   b. 3" X ¼" - ½" flat plate 18-24" in length (varies by need)
   c. 1-1/2" X 4" X ¼" plate with a ½" hole drilled in the center*
   d. ¾" square tubing 12" in length*
   e. 3 each - 3/8" X 2-3/4" standard machine bolts*
   f. 3 each - 3/8" nylon insert lock nuts*
   g. 6 each - 3/8" flat washers*
   h. 3 each - 3/8" flat Teflon or plastic washers*
   i. 2 each - ¼" square nuts or flange nuts*
   j. 2 each - ¼"X ½" Allen head set screws*
   k. 1 each - letter sized bit to match bolt diameter.
   l. 1 each - ½" X 2-1/2" machine bolt (threaded to cap)
   m. 1 each - ½" flat washer and machine nut.
2. Cut the arms - The arms I used are 12", 8" and 14" in length. This gave me more than 20" of free arm space for moving the end of the tool. I cut to length with a porta-band then sanded the ends with my 12" plate sander. (remove dust chute or be ready to put out the fire.)
3. I then drilled the holes for the bolts using a letter sized bit to fit the bolts without any appreciable slack. (A letter sized bit will give you the exact sized hole you need for the bolt. You must have the bolt you will use. Slack is vibration, you'll understand when you begin to hollow.)
4. To lay out the bolts, I used a vernier caliper and found the exact center of the bar and then laid that distance off the ends. The most critical

* Available at Home Depot, Lowes or your local home improvement center.

part of drilling is to have the drill press drilling at exactly vertical. You cannot have any deviation from vertical. (See tip on Cap's Notebook for this adjustment.) Drill holes in both ends of the 12" and 10" piece ½" off the ends and centered in the width. You only drill one hole in the end of the 14" piece. (unless you get creative and make an extremely versatile hollowing tool)

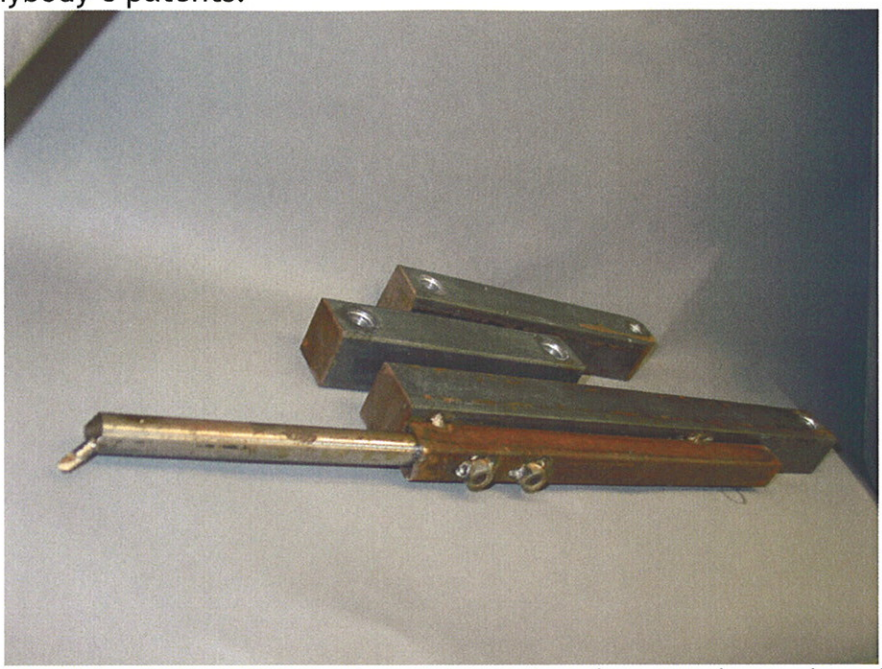
5. Next is the creation of the bed bracket, base bolt and welding on the tool holder. You need the exact height of the center of your lathe from the bed. My mini is 5-1/8". I then subtracted ½ of the bar, plus the washer, which totals 9/16". I then created the base with of a piece of 12" X 3" X ¼" flat bar stock, with a 9/16" hole bored for the anchor bolt. (See photo) welded to a piece of the same material to an overall height of 4-9/16". This is a critical dimension for a complete "fly-by" of the arms. To make the base bolt, insert the bolt in the piece of plate and apply a spot weld to keep it from turning.
6. I then welded on a section of 1" stock, with a hole drilled in it, flush to the top of the bracket. This must be absolutely square to the base of the bed. (Insert a bar in the hole and square it to the lathe bed before you weld it in place.)
7. To make the forward arm, weld the piece of ¾" tube to the side of the arm with several ½" spot welds. Then drill two 5/16" holes on the side and weld on two square nuts. Use either Allen screws or bolts for the attachment of your tools.
8. To assemble, put the parts where shown, snug-up the lock nuts to prevent vibration, lube the points as you assemble. Insert an Ellsworth hollowing tool. Set up your tool rest to cut slightly above center and start hollowing.

I have several bed brackets made for several lathes. The design allows you to rotate the tool above and beyond the bracket for ease of cutting and allows you to go to the "other side" for hollowing where you can see, in reverse. (You have to sharpen or modify tools to do so, but it's worth it.)

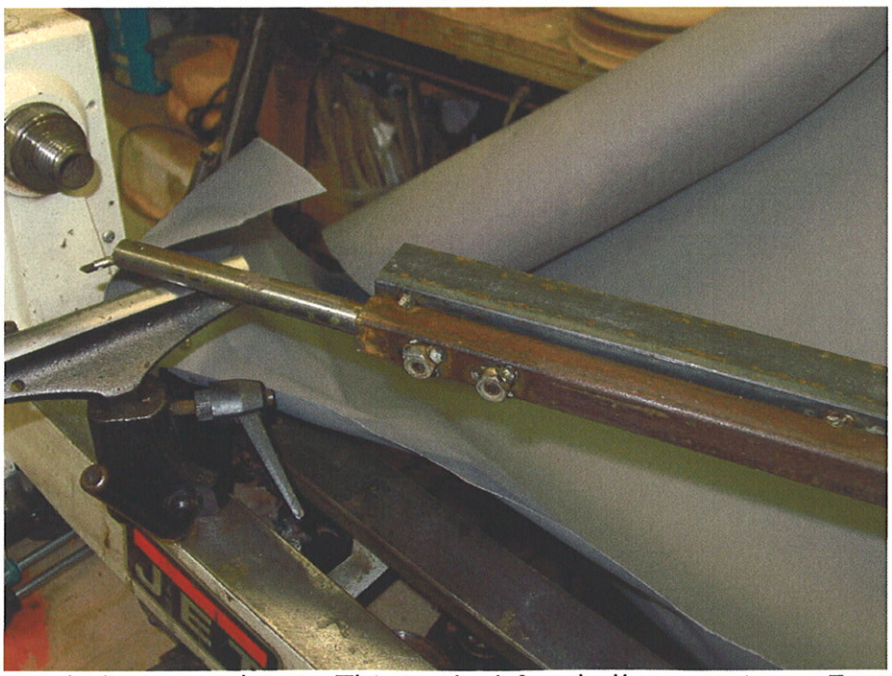
Variations on a theme: Make more than one forward arm. Make several versions to hold all your different tools. I have one for Ellsworth, one for Sorby minis, one for a Kelton and one for the Jameson type tools. Making another arm with a smaller (1/2") tool holder will connect to Sorby Minis. I move the rig from lathe to lathe without hesitation. I have fixed the locknut at the bracket and this allows me to assemble and disassemble with one 9/16" wrench. (We recently cut out 5 rigs for my woodturning partners, with all the hardware and attachments (without tools) for under $75.00. We did all the welding and drilling in about 3 hours, sandblasted and painted them in one day. We all shared the cost, the labor and the effort. Hollowing rigs for under $25.00 each)

* Available at Home Depot, Lowes or your local home improvement center.

Now, when you hollow, think that Capt. Eddie helped get you there. And don't violate anybody's patents.

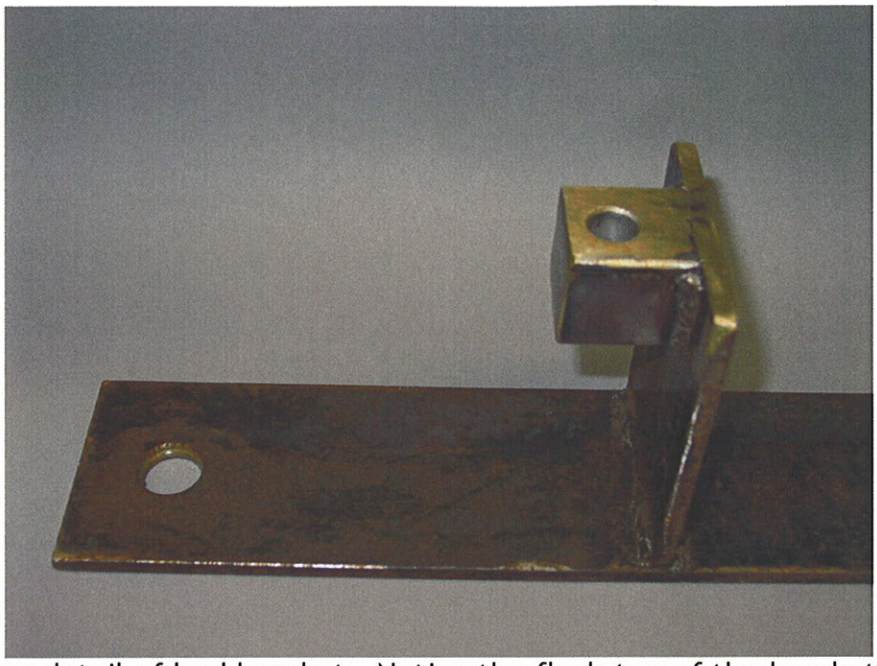


The three sections of steel needed for the rig. The one closest has the tool attachment tube welded on. This is the arm you can change out for different tool holders.

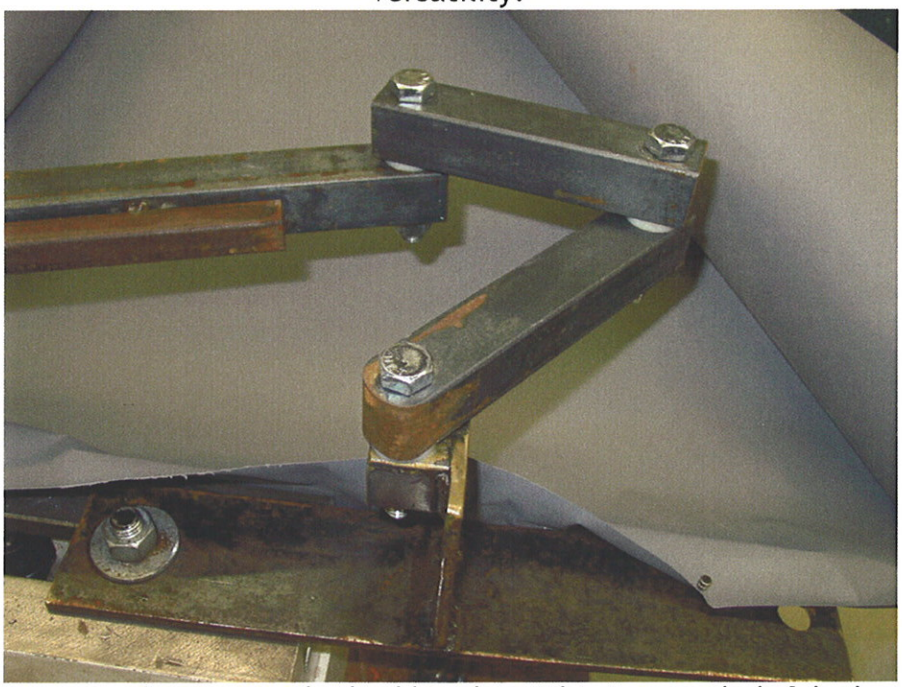


Tool extended over tool rest. This is ideal for shallow turnings. For deeper turnings you can move the tool rest back to the solid stock. A little wax on the rest and the tool makes everything move easier.

* Available at Home Depot, Lowes or your local home improvement center.



Close-up detail of bed bracket. Notice the flush top of the bracket. This allows the tool arms to pass over the bracket. Move movement, more versatility.



The Snake moving back over the bed bracket. This is most helpful when using it on a short bed lathe. Exchange the short arm for the upper arm and it moves around 360 degrees. (see sketch provided for measurements)

* Available at Home Depot, Lowes or your local home improvement center.

Way too much clutter, but you can see the entire Snake laid out on a mini-jet lathe. I should have attached a bowl to show the use, but you get the idea.


* Available at Home Depot, Lowes or your local home improvement center.

Steel Snake Hollowing Tool Layout

This is the Snake laid out open. You can see the dimensions and the location of the pieces. Note that the space between the two lower bars is 9.75" This is more than enough to pass over the 8" bar when the snake is pulled back completely. This gives the overall range more than 18" and a tool presentation of the full range of the opening. This will allow you to insert your angled Ellsworth tool into a small opening and work from there.