Drawing Out

1. Shelf bracket made by Peter Ross. The snub end scrolls were made by making a very long ribbon taper, then tightly rolling the taper to form the snub end. This method of forging snub end scrolls was typical of English 18th century ironwork.

by Dereck Glaser

Photos by Dan Nauman

Lesson #16- Forging a Ribbon Taper

Definition: Reducing the cross section of a bar

Overview:A ribbon taper tapers in thickness while the width of the parent bar remains constant.

Intent: The student will forge a ribbon taper with a resulting taper length of 2 3/4", while maintaining the width of the original parent stock..

Tools: Basic tools, including a straight edge, and outside calipers.

Material: Mild steel, 1/4" x 3/4"x 24".

2. Notice the angle of the hammer and of the bar, as well as bar placement on the anvil.

Forging dynamics: In Step One, your task is to produce a "set up shape." (See *Terms* at the end of this lesson for a definition of set-up shape.) The set-up shape you will produce reduces width and increases thickness. This shape facilitates the drawing of the ribbon taper in Step Two. Were the thickness reduced first, the resulting increase in width makes the bar difficult to forge back down to the parent stock width, as the material wants to fold. (See photo 4a)

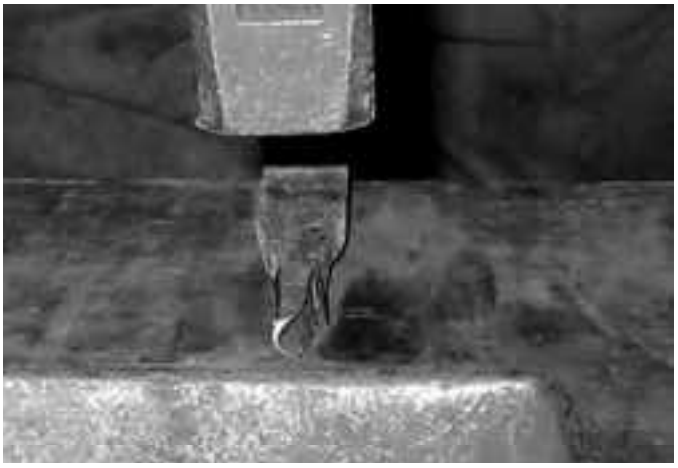
Step One

Take a bright yellow heat two inches long. Place the heated portion level on the anvil with the end even with a rounded far edge of the anvil to prevent the angled edge of the hammer from contacting the anvil face. Place the bar standing on edge so that you are looking at the thickness of the material, and with the end you are holding slightly elevated. Begin to forge the end with a

3. Side view of the set-up shape. Notice how the thickness of the parent stock has increased towards the tip.

3a. Top view of the set-up shape. Notice that the width of the par - ent stock has decreased towards the tip.

4. Correct position of the bar and set-up shape on the anvil to begin drawing out the ribbon taper.



4a. If the set-up shape is forged too thin, the metal will fold when drawing out the ribbon taper, as shown here.

slightly angled hammer, just about the width of your hammer face. (See Photo 2) Continue forging to lengthen the taper to produce a symmetric angle to both sides, being careful to keep the taper centered to the parent bar.

Forging dynamics: If you only work one side of the bar, mushrooming of the metal on one side will occur. This happens because more force is coming from the hammer, displacing more material than the force from the anvil. You will need to rotate the bar 180 degrees, alternating blows on the opposing sides, to avoid this problem.

At this point, the bar has decreased in width, but increased in thickness. This is your set-up shape, and should measure 1 1/2" long. (See Photo 3, and 3a)

Step Two

Take a bright yellow heat two inches long, placing the end being forged in the same area of the anvil as in Step 1, with the wedge perpendicular to the face of the anvil. (See Photo 4) Keep the bar parallel to the face of the anvil as you re-establish the thickness. You will witness the width you reduced begin to widen as the thickness begins to reduce. Forge rhythmically and symmetrically, rotating the bar 180 degrees at regular intervals to maintain an even width.

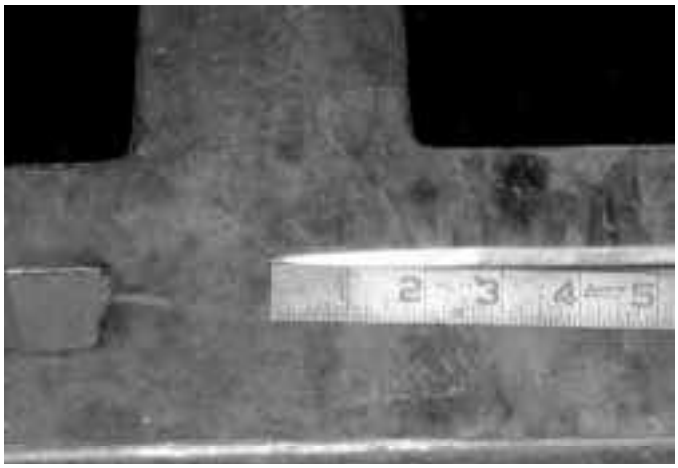
Next, slightly elevate the holding hand and begin to forge the very end of the bar, angling the hammer face in a complimentary angle to the raised bar. (See Photo 5)

As you forge, you will see the set-up shape begin to transform into the intended shape. As your proficiency of forging grows, alternate the blows to forge the thickness and the blows controlling the width. Rhythmic forging is important, as it allows you to incorporate more forging blows of various purposes into each heat; enabling you to get more work done. Keeping the taper on center is an ongoing process, and best not left to waiting until the taper is completed. (See CHF lesson #11 for straightening techniques, the *Hammer's Blow*, Vol 13, #2, Spring 2005.)

To increase the length of this type of taper, first make sure that the width has been established. Then proceed to forge the bar back, behind the tip, drawing out more of the parent bar into the taper. (See photos 6 and 7 for the final shape of the ribbon

5. Correct position of the bar on the anvil to finish the ribbon taper. Notice that the bar is slightly elevated on the holding end. Note also the angle of the hammer.

6. Top view of finished ribbon taper



7. Side view of finished ribbon taper, and checking with straight edge.

taper.)

Targets:

-The taper should be centered on the bar.

-Edges should be straight, faces flat. (No concavity or convexity. Check with a straight edge.)

-The bar should maintain the original parent stock width. (Check with outside calipers, see photo 8.)

-With practice, you should be able to make this taper in one heat. -Two to three heats would be acceptable for the first attempts.

-The finished taper should be 2 3/4", plus or minus 1/16".

Note: If you subtract the non-forged portion of the bar from the overall length of the starting length, the difference will tell you how much of the bar was used for the taper. This is useful information, providing you observed the original stock size.

-The end of the bar should not be more than 1/64" (one sixty fourth of an inch) in thickness.

8. Checking width of ribbon taper with outside calipers.

Note: An alternate process to minimize the 360 degree spread of material would be to use the horn of the anvil to draw out the taper. This could be done in conjunction with the set-up shape (resulting in vastly different results), or by itself, eliminating the set-up shape altogether. The rounded shape of the horn acts as a cross peen, or fuller, directing most of the material in two opposing directions.

Terms

Set-up shape- A shape that is made early in the forging process to facilitate, anticipate, and define the final shape of the forging.