



General Purpose Blacksmith's Tongs

Introduction

It's essential in blacksmithing to have good sets of tongs so that you can firmly hold hot metal that you're working with. You'll need different sizes and styles to match the thickness and shapes of the metal that you're using in your projects. A blacksmith can't have too many pairs of tongs.

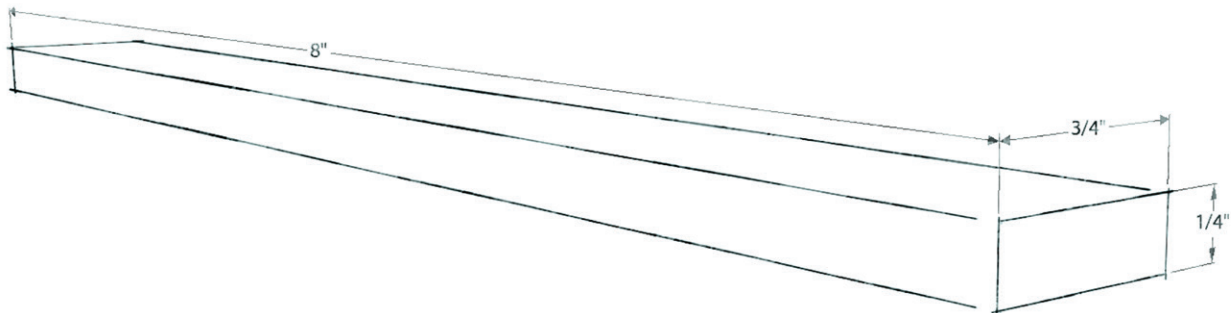
Tongs are made of three pieces of metal — two long side pieces that work similar to the

side pieces in a pair of scissors and a rivet that holds the side pieces together and allows them to pivot. In each side piece, there are three segments — the jaw, the boss, and the rein. The left and right sides of the tongs are identical in shape. In other words, they're not mirror images of one another. If you flip one side over, it will fit together and line up perfectly with the other side.

Material

For this project, we will use $\frac{1}{4}$ " x $\frac{3}{4}$ " x 8" mild steel. This lightweight stock is easy to work with and will make a lightweight set of tongs that work well for holding light stock. Using slightly thicker $\frac{5}{16}$ " x $\frac{3}{4}$ " stock would make a very nice set of tongs for general work.

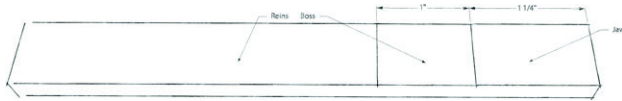
There are different styles of tongs. The set that we're making here will hold flat and square metal, but you can modify the jaws of your tongs to hold other sizes or shapes of metal.



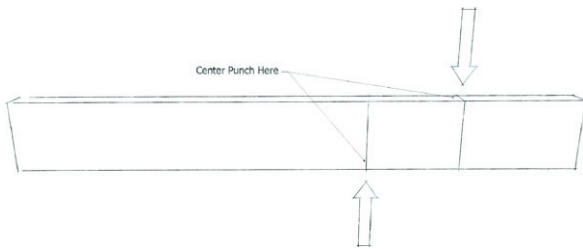
Instruction

Marking

- Mark the stock with soapstone, 1 ¼" from the end to define the jaws and 1" from that mark to define the boss.



- Because the soapstone will not be visible when the steel is hot, also mark the stock with a center punch. When doing this, mark opposite edges as shown in the diagram.



Define the Boss

- Using a half-face hammer blow on the far side of the anvil, define the boss by indenting both edges, as shown below. Later we will slit and drift the boss to make a round hole for a rivet that will be the pivot and joinery of the tongs.

Draw Out, Round and Plenish

- Draw out the reins to the desired length by hammering on alternate edges.
- As you draw out each section to its finished dimension, complete the work by breaking the corners (hammering the corners so as to round or bevel them) and plenishing (hammering at a lower temperature to smooth the steel and remove any large hammer marks, as shown below).

Compare and Adjust the Length

- Hold the two side pieces side-by-side to compare the length. If one is longer than the other, draw out the length until both pieces match.

Twist the Jaw

- Clamp a side piece in the vice and make a short 90 degree twist right at the junction between the boss and the jaw, as shown in the sequence of photos below. Repeat with the other side piece. Remember that these pieces should be turned the same direction.

Hammer the Jaw and Boss

- Gently hammer the corners of the twist smooth, so that the jaw and the boss are smooth and square.

Prepare the reins for riveting

- Use a centerpunch to mark the hole for the rivet.
- Begin to cut the rivet hole using a slitter that is 3% bigger than the size of the rivet you will use. In this case, 3/8" is the rivet size. The reason for the 3% increase is both to allow for shrinkage that occurs when the steel cools and to enable the rivet to pass through easily. Orient the slitter lengthwise through the boss.
- When you have cut most of the way through and while you still have a little heat left, flip the piece over, and you will see a shiny spot which is where the slitter will come through. With the slitter, mark the hole in the center of this spot, and on the next heat, cut through from that side.
- Drive the slitter all the way through to open up the hole.

- Using a drift that is 3% larger than the rivet, drive it through, working from each side alternately.
- After you have used the drift, the hole will be round, as shown below.

Rivet the pieces together

- Use a rivet whose length is the combined thickness of both sides of the tongs plus 1 1/2 times the diameter of the rivet. In the fire, first pack the coke so that the rivet won't fall through, then set the rivet on top. Keep an eye on it so that you don't lose it or burn it up.
- Put the rivet through the hole and hammer it down.

Free the Tongs

- When you finish setting the tongs, they should be too tight to move. Heat them and work them back and forth while they're hot in order to free them.

Adjust to Fit the Stock

- Adjust the tongs in the vice to fit them to the size of the stock and align the reins.
- Adjust the tongs to fit the stock
- Work the tongs while quenching them; otherwise, they will get stuck.

