Padlock

By Peter Keep

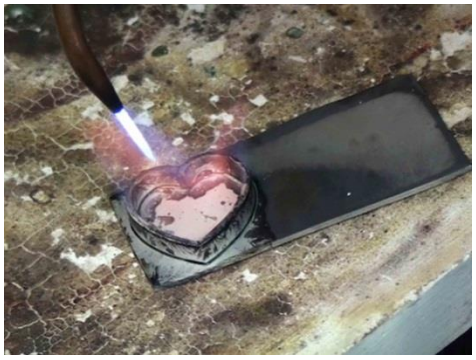
Jewellery Training Solutions offers online training for professional jewellers apprentices and hobbyists.
This tutorial demonstrates how to make a padlock typically worn on a charm bracelet.
This technique requires advanced soldering skills and focused on making and understanding a mechanism. This has been an apprentice favourite for decades and demonstrates how to work harden a fastening component. This is an ideal test for advanced first year apprentices.

1.
This project requires the following materials; Sterling silver sheet = 0.9mm x 20mm x 40mm. Strip = 1.1mm x 3.5mm x 70mm. Round wire = 1.6mm x 60mm.
Draw a heart shape roughly the size of a two dollar coin on tracing paper. Make sure it is perfectly symmetrical by drawing half the shape and folding the paper at the axis line. Then trace the shape to form a perfect heart.

2.
Use half round pliers to bend the strip of silver into the heart shape. When it comes to the point of the heart, cut squarely along the strip with your piercing saw before you bend it. This will make a sharper angle. Keep checking on your drawing to ensure it is symmetrical. Adjustments to the shape can be made easily if you overlap one end. Hard solder the connecting joint at the top and run solder into the mitre joint at the point.

3.

Ensure the sheet of silver is prepared for soldering by emery cleaning it. File one side of the heart shape flat and apply an ample amount of flux. Place the parts together making sure that the flux on the heart transfers to the sheet. Place several snips of solder around the inside of the joint. Using a neutral to oxidising flame. Balance the heat distribution between the two components until soldering temperature is reached. Bear in mind that the heat will sink into the solder mat, so the sheet will require more heating.



4.

Now saw pierce around the back plate with a 1mm overlap.

With the left over strip, wrap it tightly around round nose pliers to form a piece of tube. The tube needs an inside diameter of 1.6mm. This takes some practice to get right. Final tightening and closing of the joint can be done with parallel pliers. Drill a 1.6mm hole in at the tube joint. Fit the round wire in and hard solder. The solder should seal the tube joint as well as fix the wire in place.

5.

Drill out the excess wire from the tube. Tightly clamp the end of the wire into your vice. Grip the tube carefully with your draw tongs or similar and twist the wire around. Keep the wire taught and aim to twist it around two revolutions. This gives the wire maximum hardness as it is hardened right through its core as opposed to just surface hardening. This technique is ideal for catches & mechanisms.

6.

You can now shape the padlock arm. Again, make sure it is symmetrical and lines up correctly with the padlock body. You also need to carefully plan for the arm length. To achieve the sharp bend, file a long mitre joint into the wire and bend it over. You will need to apply easy solder to the joint with a sharp oxidising flame to minimize heat conduction and keep the arm hardened.

7.
With the arm held in the lock position onto the body, use a scribe to mark the contact points of the tube hinge onto the frame. Cut the section out of the frame and file the correct angle that will allow it to function properly and minimise the gap.

8.
With the arm in position, mark through the tube hinge for the rivet hole. Drill through at this point and open the hole to fit the 1.6mm round wire off cut. It must be a tight fit. You can now put the components together whilst planning and marking for the catch opening. The catch will work most efficiently when it clicks into place at the top of the curved frame. You may need to bend the arm in a little to ensure it functions properly.

9.

Mark the frame at the catch point and cut a section out that will allow the arm to enter inside without obstruction. Cut a groove into the arm at the point where it will click into the frame. Once you are certain that the mechanism works you can make the front plate. With the remaining sheet of silver, make a duplicate of the back plate and add a key hole for decoration.

10.

Make a 3mm jump ring with 1mm round wire to attach to the heart. If you hard solder a piece of wire to it at the joint you can friction fit the jump ring in the correct position and solder it when you solder the front plate. Make sure the front plate is lined up perfectly. Flux and place solder around the joint. Use easy solder and again balance the flame from one component to the other accordingly. A good option for avoiding heat sink is to place the piece on wire mesh during the solder operation.

11.

Pilot drill through the front of the padlock from the hole in the back plate. Open the hole with a flame or bud bur until the 1.6mm rivet wire fits tightly. Countersink the holes. Now put the arm into the body and lock into place with the wire. Leave around 1mm exposed on both sides. Now use a flat tapered punch or a riveting hammer to spread the rivet wire ends. Keep turning the piece over to even the spread. The metal should move into the countersunk rim.

12.
During the riveting process, keep checking that the arm still has free movement. Now push the arm into the body and ensure that the mechanism operates properly and clicks firmly in place. Cut several grip lines at the top of the arm. The arm should maintain springiness due to being core hardened. File the rivet ends flush with the body and emery clean the padlock before polishing.

Check your work.
There should be no evidence of the rivet and the mechanism should have an audible click when operated.
The video tutorial for this lesson can be found under the Apprenticeship training (Silver level), stage five.
In the next edition I will show you how to make a Four Claw Solitaire.

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