

Rivet, Riveting, Riveted

By Gwen Youngblood

The Riveting Essentials riveting tools are a unique set of tools designed by Gwen Youngblood to make riveting easy-peasy and nearly foolproof. Rivets are formed with short pieces of wire, which are passed through holes in the jewelry pieces and the ends of the wire are flattened to secure the pieces in place. The wire used to form the rivet must be of the proper diameter, i.e. fit snugly in the holes. And more importantly, the wire must be cut to the proper length – too short and the rivet will not be secure; too long and the wire will bend instead of flatten. Learning to cut the rivet wire to the correct length to form the rivet properly has been the “trickiest” part of learning to rivet, usually requiring a great deal of practice.

In this project, students will explore the full range of functionality of the Riveting Essentials tools. Students will learn to use the Riveting Essentials Rivet Gauges[†] to cut the rivet wire to the correct length every time. In addition, students will learn to use the Riveting Essentials Tiny Dapping Block to maintain the round head of the ball-head rivets. Students will also learn to use the Rivet Punches[†] to cold-connect a bezel cup. Finally, students will also learn some simple metal working techniques.

Materials List

- Copper and silver sheet metal, 24 or 26 gauge
- Variety of decorative spacers
- 3 inches of 14 gauge fine silver round wire
- 8 inches of 16 gauge fine silver round wire
- 3 inches of 18 gauge fine silver round wire

Tool List

- Riveting Essentials Riveting Tools
- Chasing hammer
- Plastic mallet or rawhide mallet
- Bench block with pad
- Shape template(s)
- Permanent marker (fine tip Sharpie)
- Wubbers classic medium flat nose pliers
- Wubbers classic chain nose pliers
- Safety glasses
- Pro-Polish Pads
- Flat #2 hand file
- Center punch
- Utility/household hammer
- Butane torch
- Cross-locking tweezers
- Metal shears or jeweler’s saw with 4/0 saw blades for 24 gauge metal or 6/0 saw blades for 26 gauge metal
- Texture hammer(s)
- Drill (hand drill, Dremel or Flexshaft) with #52, #56 and #60 drill bits
- 1.25 mm and 1.80 mm hole punching pliers
- Liver of sulfur
- Sandpaper – 300 grit or finer
- Round diamond needle file
- Plastic fork
- Flush cutters rated for at least 14 gauge wire
- Quench bowl of plain water
- Butane
- Scrap block of wood



Making the Backplate & Bezel Backplate

Step 1. Gather two contrasting metals, two templates, one a circle template and a permanent marker, such as a Sharpie. In this project, 26 gauge copper and sterling silver are used.

Templates are available from a variety of sources, such as office supply stores, hobby stores and online sources. The ones used in this project are templates used by precious metal clay (PMC) artists to shape PMC.

Using the templates and the permanent marker, trace the shapes onto the metal.



Step 2. Using either metal shears or a jeweler's saw, cut the traced shape from the metal.

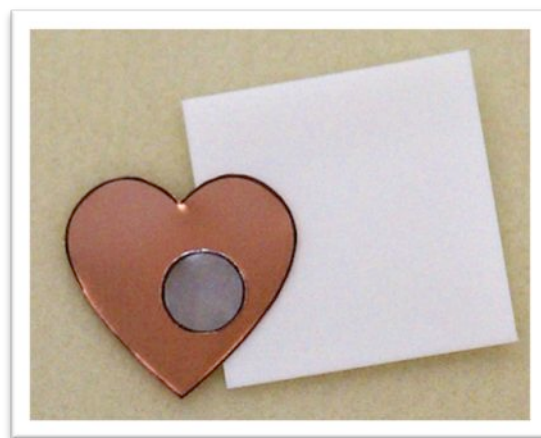
If using a jeweler's saw, size 4/0 saw blades are recommended to saw 24 gauge metal. Size 6/0 saw blades are recommended to saw 26 gauge metal.

If there are any sharp places on the edge of the metal, use the flat hand file to gently file the edge to remove the rough spots and refine the shape. Hold the edge of the metal flat against the surface of the file. Push the file away from you to remove the offending metal. NOTE: Jeweler's files only cut on the "push" – no need to work the file back and forth.



TIP: ALWAYS wear safety glasses when cutting wire and metal – small pieces of wire or metal can fly into unprotected eyes.

Step 3. Pro-Polish Pads or sandpaper can be used to remove any remaining permanent marker from the metal.



Step 4. The act of cutting the metal, especially with metal shears, and/or texturing the metal may cause the metal to warp. A plastic or rawhide mallet is used to flatten metal.



Step 5. To flatten the metal pieces, place on the bench block and tap the surface of the metal lightly with a plastic or rawhide mallet.

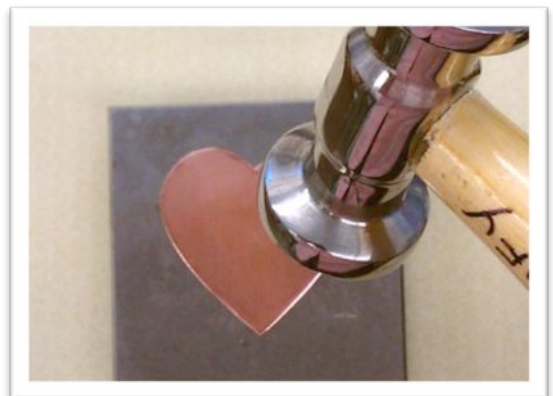


Adding Texture

Step 6. Many methods exist to texture metal. For this project, two different textures are used— a two-sided texture hammer and a Fretz Silversmith Small Embossing Hammer. These are used to impart added interest to the metal.



Step 7. Place the larger metal piece (copper in the example) on the bench block. Hammer randomly with the two-sided texture hammer.

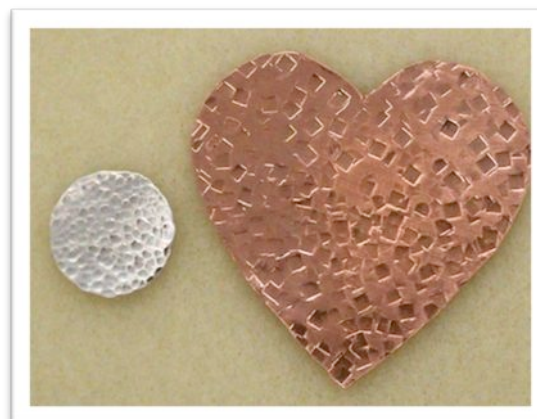


Step 8. Place the smaller piece of metal (in this example, silver) on the bench block. Randomly hammer the metal with the Fretz hammer. If the Fretz hammer is not available, the peen side of the chasing hammer can be substituted.



TIP: Cutting and/or hammering metal may cause it to warp. If this occurs, place the metal on the bench block and hammer with a plastic or rawhide mallet. The plastic/rawhide mallet will flatten the metal without marring it or flattening the texture.

Step 9. The pieces of metal are now textured and more interesting for use in the jewelry piece.



Adding a Patina

Step 10. Additional interest can be added by using a chemical patina, liver of sulfur, to “age” the metal.

Add a small amount of liver of sulfur (either gel or rocks) to a bowl of warm water. Do this in a well-ventilated area. Liver of sulfur smells like rotten eggs. Avoid getting the liver of sulfur on your skin/hands.

Prepare a second bowl of plain water to serve as a rinsing bowl for the patinated pieces.

Dip each piece individually into the liver of sulfur solution. When the desired level of patina is achieved, remove and rinse in the plain water. A plastic fork is a good tool to use for this process.

Copper and sterling silver react differently to the liver of sulfur. Copper may patina much quicker than sterling silver. Because of this difference in reaction time, it is a good idea to patina metals separately whenever possible.



Step 11. Using the fine grit (greater than 300 grit) sandpaper, polish-off some of the patina from the surface of the metal pieces. This process removes the patina from the “high” spots of the texture, while leaving the patina in the “low” spots of the texture. This action highlights the texture. Remove as much or as little of the patina as desired.



Adding Decoration

Step 12. Arrange the elements as desired on the base (copper) piece. Mark the position of the spacers with the permanent marker.

Using the permanent marker, mark the desired positions of the ball-head rivets..

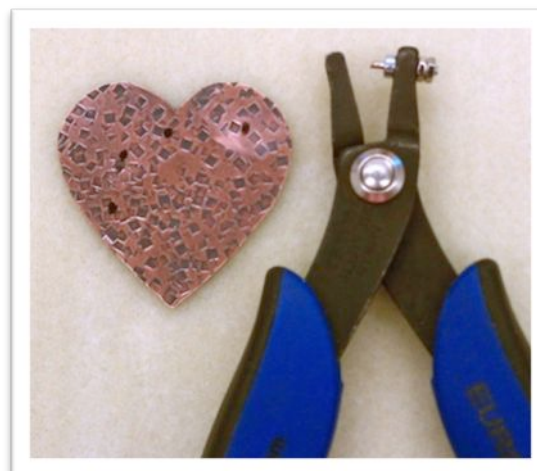
The ball-head rivets will be formed and set first.



Step 13. The ball head rivets are purely decorative. Therefore any gauge wire can be used to form the rivets. In this case, 16 gauge fine silver wire is used. The punch of the 1.25 mm hole punching pliers is a slightly smaller diameter than the diameter of the 16 gauge wire. The 1.25 mm hole punching pliers is used to punch the rivet hole. A round diamond needle file is used to enlarge the rivet holes just slightly.

Twist the diamond file back and forth in the hole until the hole is enlarged just enough to accommodate the wire.

NOTE: Diamond files work in all directions.



TOOL TIP: The diameter of the hole must match the diameter of the rivet wire. If 14 gauge rivet wire is used, use a #52 drill bit in the drill to drill the rivet hole; a #56 drill bit or 1.25 mm hole-punching pliers for 16 gauge wire, or a #60 for 18 gauge wire.

Creating the Ball-Head Rivets

Step 14. To create the ball head rivets, gather the heatproof surface, butane torch, quench bowl of water and cross locking tweezers.

Set up your work area with the quench bowl in front of you on the heat resistant surface. The torch should be set up such that the flame will be over the quench bowl. *Be careful where the flame will point.*

Put on safety glasses. Fill the torch with butane according to its instructions. Remove the butane from workspace. Light the torch and set it on the heat resistant surface such that the flame is over the quench bowl and is pointed at an angle away from you.

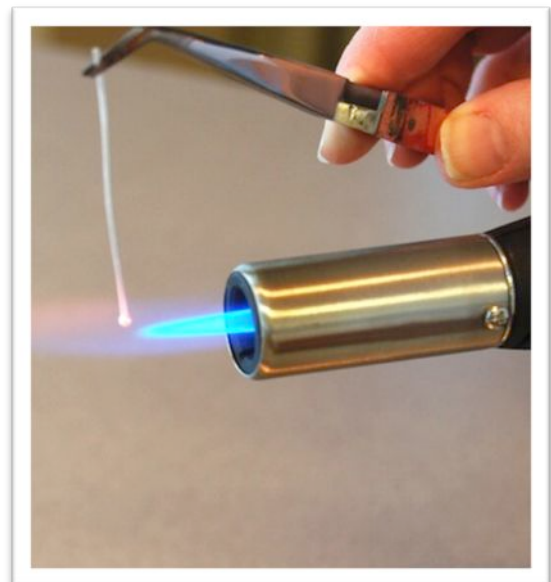


Step 15. Cut the 16 gauge fine silver wire into at least four 1½ inch pieces of wire.

Grasp one end of a wire piece with the cross- locking tweezers. Hold just the very tip of the free end of the wire piece in the flame.

The end of the wire will begin to form a ball. Don't let the ball get too big or it will drop off into the quench bowl. When the ball is the size you desire, take the wire out of the flame. Let it cool until the glow is gone and lower into the quench bowl to cool.

Turn off the torch.



SAFETY TIP: ALWAYS wear safety glasses when cutting wire and metal – small pieces of wire or metal can fly into unprotected eyes.

Step 16. The rivets will not be the same length. Make a few extras to have on hand.



Step 17. Test fit the ball head rivets in the rivet holes. The tail of the rivet must fit snugly through the rivet hole. If the hole is not large enough, enlarge slightly with a round diamond file.

Insert the tip of the file in the rivet hole and twist back and forth, enlarging the rivet hole.

Remember, the diamond file works in all directions.

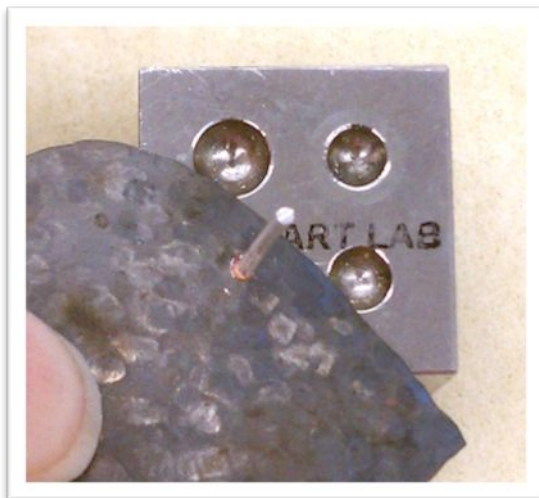


Step 18. The tiny dapping block will be used to set the ball-head rivets.

Place a ball-head rivet through one of the rivet holes. The ball of the ball-head rivet will be on the front, with the tail extending through the rivet hole to the back.

Invert the piece and place the ball-head in one of the small cavities of the tiny dapping block. Use the smallest cavity that accommodates the head of the rivet. This will help stabilize the piece. There should be a small amount of space between the top of the dapping block and the face of the piece. This will prevent any marring of the piece when the rivet is set.

Hold the piece firmly so the ball-head rivet does not wobble. It is helpful to place a finger on either side of the rivet to stabilize it.



Step 19. Place the corresponding Rivet Gauge† over the tail of the rivet and hold the assemblage of pieces in place, stabilizing the pieces with two fingers.



TOOL TIP: Rivet Gauges† come in pairs and are marked with the wire gauge to which they correspond. Only one of the pair is used with ball-head rivets. Rivet Gauges† stamped with a 14 are to be used with 14 gauge rivet wire, those stamped with 16 are to be used with 16 gauge rivet wire and those stamped with 18 are to be used with 18 gauge wire.

Step 20. With the back of the flush cutters firmly against the Rivet Gauge†, cut the tail of the rivet wire. Control the cut tail of rivet by holding your finger on the end of the wire while cutting.

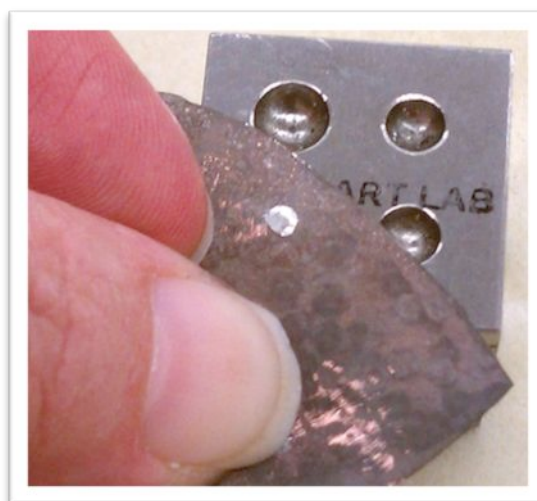
Don't forget to wear your safety glasses while cutting!



Step 21. Remove the Rivet Gauge†, exposing a short stub of rivet wire.

Using the peen side of the chasing hammer, gently tap on the exposed stub of rivet wire until it begins to spread and flatten.

Continue tapping until the stub is completely flattened. It will resemble a tiny mushroom cap.



Step 22. Complete the remaining ball-head rivets as outlined in the previous steps.



Riveting the Decorative Spacers

Step 23. The next step is to work on riveting the spacers in place.

Using the center punch, mark each rivet spot with a divot. Place the metal piece on the bench block. Position the pointed tip of the center punch on the rivet spots. Tap the end of the center punch with the utility/household hammer to make a small divot in the metal.

The small divot will provide a place to rest the tip of the drill bit when drilling a hole. The divot prevents the drill bit from “skipping” across the surface of the metal



Step 24. Determine which gauge of round wire fits snugly through the hole of each spacer. The wire should fit snugly in the hole of the spacer. The wire should not “wobble” around in the hole.

Occasionally, a spacer will have a hole that is too large for one wire, but too small for the next larger diameter of wire. In these situations, use the round diamond needle file to enlarge the hole in the spacer. Twist the diamond file back and forth in the hole until the hole is enlarged just enough to accommodate the larger wire. NOTE: Diamond files work in all directions.

Make a note of which spacer uses which gauge of wire. This will be important when it is time to drill

Step 25. Securely tape the copper piece to a wooden block using painter’s tape. Painter’s tape will not leave a residue on the metal.

Rest the tip of the drill bit in the small divot and drill the hole in the copper piece.

Remember, the diameter of the hole must match the diameter of the wire and the size of the spacer.



Step 26. To start forming the first rivet, place a Rivet Gauge† on the bench block. The Rivet Gauge† should correspond to the gauge of rivet wire, which corresponds to the size holes drilled in the metal.

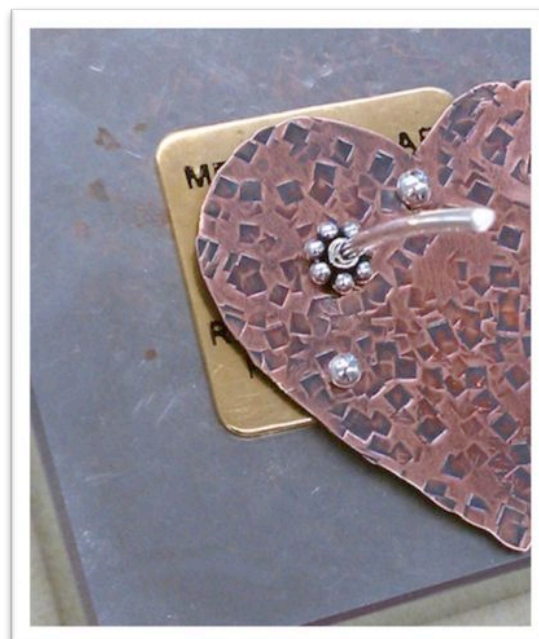
Test fit the wire in the holes in the spacer and metal piece. If any of the holes are too small, use the round diamond file to enlarge the holes until the wire just fits through the hole. The wire needs to fit snugly in all the holes through which it passes.



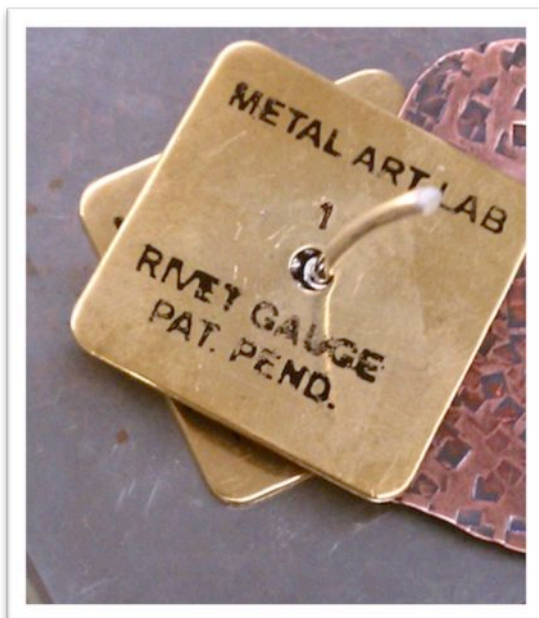
Step 27. Stack the spacer and metal piece on top of the Rivet Gauge†, aligning the holes for the first rivet.

Flush cut one end of the rivet wire. A flush cut is achieved by holding the flush cutters so that the flat back of the cutters is pointed towards the length of rivet wire and nip off the end of the wire.

Pass the wire through the holes of the spacer, the metal piece and the Rivet Gauge†, **making sure the flat end of the wire is firmly against the top of the bench block.**

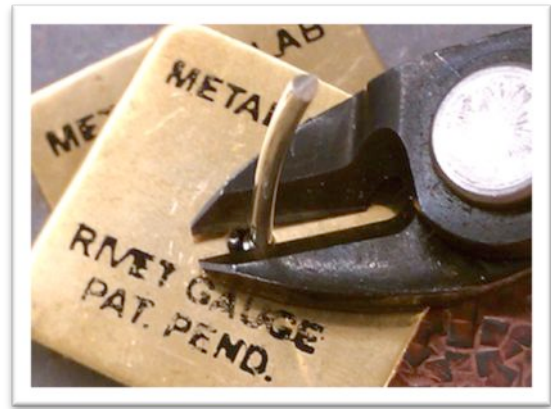


Step 28. Thread the second Rivet Gauge† over the rivet wire (rivet wire passes through the center hole of the Rivet Gauge†) and stack on top of the spacer and metal pieces.



Step 29. Cut the rivet wire by pacing the flat back of the flush cutters firmly against the top Rivet Gauge† . Cut the wire, being sure to control the wire after it is cut.

Remember, always wear your safety glasses while cutting!



Step 30. Remove the top Rivet Gauge†, exposing a short stub of wire.

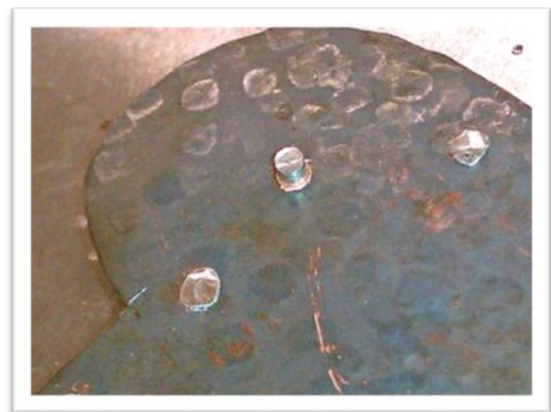
Using the peen side of the chasing hammer, tap on the exposed end of the wire until it begins to spread and flatten.



Step 31. Keep tapping the end of the wire until the stub is completely spread and flattened.

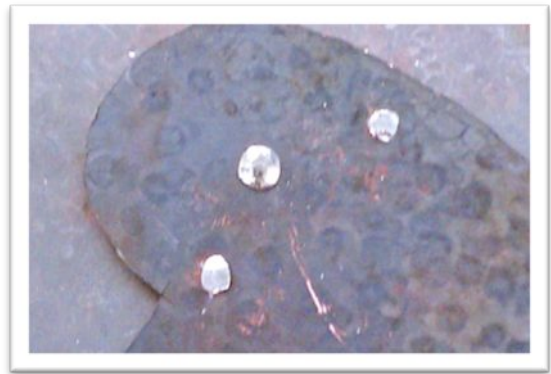


Step 32. Remove remaining Rivet Gauge† from the bench block. Turn the piece over and place the finished front side of the rivet against the bench block. This exposes a small stub of wire on the back of the piece.



Step 33. Using the peen side of the chasing hammer, tap the end of the wire and watch the wire begin to spread and flatten.

Continue tapping the end of the wire until the stump is completely spread and flattened against the back of the piece.



Step 34. Complete the remaining rivets as outlined in the previous steps.

The next step is to cold-connect the bezel cup to the piece.



Adding the Bezel

Step 35. Arrange the silver disk and bezel cup on the copper piece as desired.



Step 36. Using the 1.25 mm hole-punching pliers, punch a hole in the center of the bottom of the bezel cup.

Lay the pierced bezel cup on the silver disk. Using the permanent marker, mark through the hole in the bottom of the bezel cup to the silver disk.

Remove the bezel cup. Using the 1.25 mm hole-punching pliers to pierce a hole in the silver disk.



Step 37. Lay the silver disk in place on the copper piece. Mark through the hole in the silver disk to the copper piece.

Use the 1.25 mm hole-punching pliers, to pierce a hole in the copper piece.

16 gauge rivet wire is used to cold-connect the bezel cup to the copper piece. Test fit the 16 gauge wire in all the rivet holes – bezel cup, silver disk and copper piece.

If any of the holes are too small, use the round diamond needle file to enlarge the hole. Twist the diamond file back and forth in the hole until the hole is enlarged just enough to accommodate the wire.

NOTE: Diamond files work in all directions.



Step 38. To start attaching the bezel cup, place a 16 Rivet Gauge† on the bench block. The Rivet Gauge† should correspond to the gauge of rivet wire (16 gauge in this case), which also corresponds to the size holes pierced in the metal.



Step 39. Stack the metal pieces on top of the Rivet Gauge†, aligning the holes.

Flush cut one end of the rivet wire. A flush cut is achieved by holding the flush cutters so that the flat back of the cutters is pointed towards the length of rivet wire and nip off the end of the wire.

Pass the wire through the metal pieces and the Rivet Gauge†, **making sure the flat end of the wire is firmly against the top of the bench block.**



Step 40. Thread the #14 Rivet Gauge† over the rivet wire (rivet wire passes through the center hole of the Rivet Gauge†) and stack on top of the spacer and metal pieces.

Why is the #14 used here instead of a second #16?

Once the rivet wire is cut in the following step, the bezel cup will be stacked on the exposed stub of rivet wire. Because of this, the slightly thicker #14 Rivet Gauge† is used on the top here. This leaves a slightly longer stub of rivet wire to accommodate the bezel cup.

With the back of the flush cutters firmly against the Rivet Gauge†, cut the rivet wire.

Remember...your safety glasses are your friend!



Step 41. Remove the top Rivet Gauge†, exposing a short stub of wire.



Step 42. Stack the bezel cup on the exposed stub of wire.



Step 43. One of the Rivet Punches† will be used to set the rivet in the bezel cup. Select the largest Rivet Gauge† that will fit inside the bezel cup.

Place the flat end of the punch inside the bezel cup, firmly against the end of the rivet wire.

Tap the opposite end of the Rivet Punch† with the utility/household hammer 2-3 times to flatten the stub of wire inside the bezel cup.



Step 44. Remove the remaining Rivet Gauge†, exposing a stub of rivet wire on the back of the piece.



Step 45. Place the Rivet Gauge upright in a vise, flat end pointed up.



Step 46. Invert the piece and carefully place the bezel cup over the flat end of the Rivet Punch†. Double-check that the Rivet Punch† is securely inside the bezel cup.

Using the peen side of the chasing hammer, tap on the exposed end of the rivet wire. The wire will begin to spread and flatten. Continue tapping until the wire stub is completely flattened. It will resemble a tiny mushroom cap.

Occasionally, the stub of wire inside the bezel cup requires additional flattening. If this occurs, place the piece on the bench block and insert the Rivet Punch† into the bezel cup. Tap the end of the Rivet Punch† with the household/utility hammer.



Setting the Cabochons

Step 47. To set the cabochons, place the cabochon in the bezel cup, rounded side facing up.

Setting the cabochon is done after all substantial work is done on the piece. All work which could damage the cabochon should be completed prior to setting the cabochon.



Step 48. One of the easiest tools to set the cabochons with is the fine-tip Sharpie.

Place the Sharpie against the side of the bezel and push and roll the teeth of the bezel cup over the edge of the cabochon.



Step 49. Continue around the edge of the bezel, working at opposite points. The first spot is 12 o'clock, then go to 6 o'clock, then 3 o'clock, then 9 o'clock. This process will help keep the cabochon centered in the bezel.



Step 50. Once the four main points are “worked” as outlined above, “work” the points in-between (also working at opposite points) until the bezel is completely “set.”



Adding the Jump Ring Bail

Step 51. Use the hole-punching pliers to make a hole in the piece to accommodate a bail.



Step 52. A large jump ring will serve as a bail.

To open the jump ring, grasp one side of the jump ring with the Wubbers Classic Medium Flat Nose Pliers and grasp the other side with the Wubbers Classic Chain Nose Pliers. The opening of the jump ring should be between the two pliers.



Step 53. Twist the pliers away from each other to open the jump ring like a gate.



Step 54. Thread the jump ring through the hole in the metal piece. Grasp the jump ring as before and close the jump ring like a gate, reversing the process outlined above.

The piece is ready to wear.



Review Questions

- 1) How many Rivet Gauges[†] are used to set a ball-head rivet?
 - a) none
 - b) one
 - c) two

- 2) What determines the diameter of the rivet holes drilled?
 - a) The gauge of the wire that fits snugly through the rivet hole
 - b) The gauge of the sheet metal
 - c) The number of pieces being joined

d)

3) What tool is used to make a rivet hole to accommodate 16 gauge rivet wire?

- a) #52 drill bit
- b) #60 drill bit
- c) 1.25 mm hole punching pliers

4) What tool was used to flatten misshapen metal?

- a) **Plastic mallet**
- b) Flat nose plier
- c) Dapping block

5) What tool is used to enlarge rivet holes?

- a) **Round diamond needle file**
- b) Drill bit
- c) Chain nose pliers