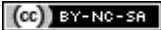


# Riveted Maille From Scratch.

By armourkris in Craft > Costumes & Cosplay  177,673  507  137 ★ Featured

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There are already a number of Instructables on making maille, and making various projects from maille. The one thing that I found was missing was how to make riveted maille.

Now, in the past I've dabbled in riveted maille a bit, my maille and plates cuise (that's thigh armour) and all the repairs on my cuirass. Thing is, for those projects I went and bought pre-made rings and rivets then just assembled them. That is hardly the DIY ethic that Instructables espouses now is it? So with a

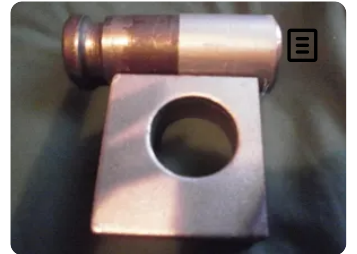
quick prayer to the gods of tedium and insanity I decided to try my hand at making my own riveted maille, from scratch.

Riveted maille is really done 2 ways, wedge rivets and Round rivets. the difference is pretty self explanatory. Wedge rivets are tiny triangles, Round rivets are tiny bits of wire. To the best of my knowledge maille started out with round rivets, then at some point, around the 14th century i think, a lot of European armouries switched over to wedge rivets, whereas maille from the middle east and Asia stuck with the round rivets. that's all pretty generalized, but it gets the idea across.

In any case, I'm making maille sleeves for my armour and my armour is a near/middle eastern style. So, round Rivets it is.

Enough of my babbling, this seems like a decent enough intro. Now onto the good stuff.

## Step 1: The Tools I Use.



Tool wise you only really need a few more tools then you need to make butted maille.

Here is what you'll need.

Standard maille tools:

- A pair of small pliers
- a mandrel for winding coils
- side cutters to cut the coils (these will be modified slightly)

The special stuff

- Rivet setting tongs
- a ring flatener
- a hammer
- a punch.

Now, to start with You'll need to grind or file a notch in your side cutters a little back from the tip. this will let you cut your rings with a little overlap. that's pretty simple.

Rivet setting tongs are pretty simple too. I made mine from a \$4 pair of carpenters nippers. You could also make them from some linesman pliers, or really any pliers with about 6 inches of handle. just grind the jaws down till they are smooth and close flush, then take a 1/8" drill bit and put a little divot into one side of the jaws. that's all there is to it.

For flattening my rings I use a piston setup. I scrounged and scavenged mine. it's just a really big brake caliper from something, and 2 chunks of 1" steel plate, one of which has hole that's about the same size as the caliper on it. alternately, with some practice you can skip the piston and flatten your rings with just a hammer, or I've seen pictures of a Whitney punch with bits modified to flatten rings. My experience is that the piston setup has the quickest learning curve and gives me the most consistent results.

the hammer is pretty self explanatory, use it to bash stuff.

That just leaves the punch. Historically speaking you'd most likely have a set of tongs with a drift and a matching hole in them and you would just pierce a hole in your rings. A lot of people still use variations on this method. I've also seen arbor presses modded to hold punches or drifts. Myself, I'm using my knock off Whitney punch with a 1/16" punch and die in it. In the future I'd like to try re-working a punch into a drift to see how that works, but until then, I'll just punch holes.



## Step 2: Making Rings



Ok, so making rings for riveted maille is almost exactly the same as it is for butted maille. The only 2 differences are that you can use thinner wire, and you need to cut them with an overlap.

In this case I'm using 16ga. tie wire. you can usually find this stuff pretty cheap in most hardware stores. You're looking for the black stuff that leaves black crud on your hands as it is not galvanized and is already annealed.

My mandrel is an old roller from a garage door and is about half way between 3/8" and 1/2" I couldn't tell you exactly what size that it is but the rings look about right for the larger rings that seem to be common with near eastern armour.

Anyways, just wind your coil like you would for any other maille, then cut them with your freshly modded side cutters. You'll want to leave 3/16" to 1/4" of overlap.

Once you've got your rings all cut it's time to normalize them. This step isn't

strictly necessary, but I

find it does help a bit. I get about 10% less bunk rings in the flattening stage if I normalize them first.

To normalize them I string them onto a loop of wire, then heat them up red hot and let them cool to room temperature. I'd heard you can do this on a gas stove, but my stove was taking too long. I prefer to use a blowtorch. Alternately I'm sure a BBQ would work wonders, or a fireplace.

Lastly, do not hold the wire with your fingers while you are blow torching the rings, it is a bad idea. Also, do not put the recently red hot rings onto anything flammable while they are cooling, it is also a bad idea.

### Step 3: Flattening Your Rings



Flattening the rings with a piston is as simple as putting a ring in the hole, placing the piston on the ring, and bashing it with a hammer. on my thigh it takes me 6 or 8 strokes. when i can put the anvil on something solid it takes me 4 strokes.

I find I get the most consistent results if i place the overlap facing away from me, parallel to the hammer handle.

## Step 4: Punching the Rings



To punch my rings I use a knockoff Whitney punch with a 1/16" bit. I think it's important to mention that historically the rings would have been pierced rather than punched as punching the rings removes a small amount of metal weakening the ring slightly. To this end I'm planning on buying another 1/16" punch and re-grinding the punch into a piercing drift. I'll update the instructable when I get to that point. In the meanwhile.....

The first thing to keep in mind punching the rings is that your overlap is sufficiently flattened, i try and have my overlaps flattened to the point where they are at least 1/8" wide and preferably a little closer to 3/16". I can still punch a hole in less, but i find that during the riveting stage the swelling rivet will often cause the sides to tear out if they are too thin.

Actually punching the rings is simple enough with the ton or so of pressure

coming from the punch. just center the overlap on the die, under the punch and squeeze the handles.

Sometimes the punch will catch on one half of the overlap. if this happens and you pull the punch back the rings get deformed and are a pain to get out. to counter this problem I took a short strip of pallet banding and cut a small slit down one end with some tin snips. After I punch a ring I slip the strip of banding over the ring and around the punch then retract the punch. the banding stops the ring from getting sucked up into the punch housing and keeps everything laying nice and flat.

## Step 5: Riveting the Rings



To rivet your rings shut the first thing you'll need are rivets. fortunately 16ga. wire happens to be 1/16" in diameter so it fits in the holes we punched perfectly. To make rivets just grab a foot or so of wire and cut it down into bits about 1/8" long. Now you have your rivets. Pretty simple eh?

To rivet a ring shut start by slipping a rivet through the hole. try and get it more or less centered.

Next take your set tongs and grab the rivet so that one end is in the divot then with smooth even pressure squeeze the tongs shut. This should compress the rivet lengthwise causing it to swell on either side of the hole, leaving a flat bump on the bottom and a domed one on the top.

When it comes time to actually weave maille I like to rivet 4 rings, feed them onto a fifth ring then rivet it. I usually make a few dozen of these at a time then

connect them all together. I don't think it's actually any faster than going one ring at a time, but it looks like it goes together faster, and that helps keep me sane.

As well riveted maille has an inside and an outside. if you're making for example a shirt the inside should have the flat sides of the rivets and the domed side should be the outside. I'm not sure if it really makes much difference in the long run, but that's how it was done back then, so that's how I'm doing it now.