

# European 4-in-1 maille (chainmail) speedweaving

by **Paul the Mole** on June 16, 2007

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## Intro: European 4-in-1 maille (chainmail) speedweaving

First of all: maille, mail, chainmail... their all different words for the same thing. I like to use the word maille, but I'm sure some like the other words better.

Maille is a form of armour. It was invented by the Celts and it became very popular in the middle ages, where it was used as 'standard' armour for almost all soldiers, because it's flexible and prevents cuts from swords, knives etc. Nowadays maille is made for other re-enactments, as 'alternative' clothing, or just for fun like I do.

Back in the days maille was made out of mild steel rings which were riveted. Which means: a lot of work. Today most of the maille is made out of steel wire. And it's not riveted anymore. It's called "buted".

The most common weave is without a doubt "European 4-in-1" (or E 4-1). This is the way the rings were linked in Europe in the middle ages. I'll come back later on the 4-in-1 thing.

I'm Belgian and I live in Brugge (Bruges). But when I was a child, I visited the "Gravensteen" (that's a castle castle) in Gent. There, someone was making maille at the time. I found it very fascinating and the thought of making some my own never leaved my mind really. Some time ago I started making my own maille. Currently I'm making a coif (have a look on Google Images if you don't know what a coif is).

The technique I use is called "speedweaving" because it's one of the fastest ways to make maille. What I will describe is not the only way to speedweave, but this is the one I use, and which works great for me. I did not invent this technique. I'm just sharing it with the world...



## step 1: Making the rings

Let's start making rings.

I used galvanised steel wire. For two reasons: it's easily obtainable and it's cheap. My wire is 1,5 mm thick.

Making rings starts with transforming your wire into coils. And then cutting the coils with a mini bolt-cutter. I won't describe the whole coil-making process but I'll include some pictures of the way I do it. Perhaps I will come back to writing this piece out one day.

My coils have an inner diameter (ID) of 6 mm, but because of a thing called "springback" the rings have a real inner diameter (RID) of 6,4 mm). My rings have an aspect ratio (AR) of 4,3. This is the ratio of RID and the wire size.

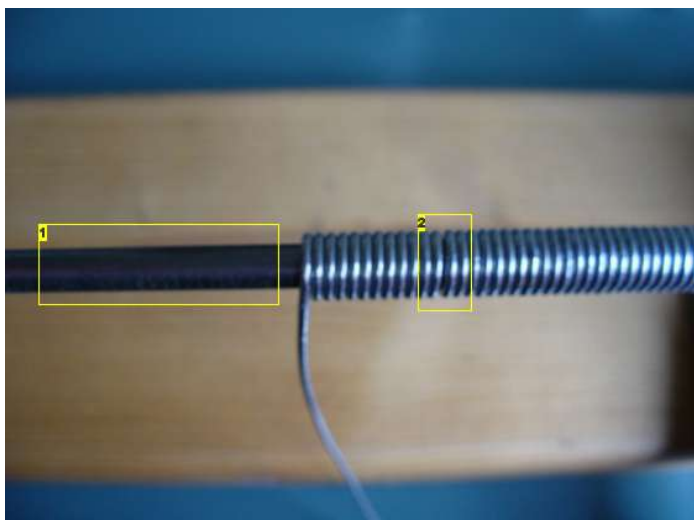


Image Notes

Image Notes

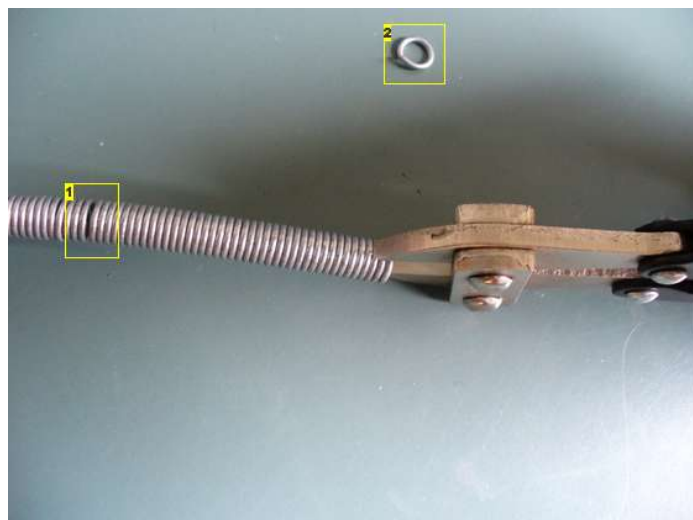
1. pliers + the coil I'm working on
2. music while I work: My Dying Bride and Therion
3. Fender-freak
4. mini bolt-cutter
5. finished coil
6. container with rings
7. handle of the mandrel
8. wood: recycled stairs
9. cheap paper-bin

1. spool of wire
2. make a coil by turning the mandrel



**Image Notes**

1. mandrel
2. hmmm... not so neat



**Image Notes**

1. Not neat. I said it before...
2. Sam said to Frodo: It's the ring isn't it.

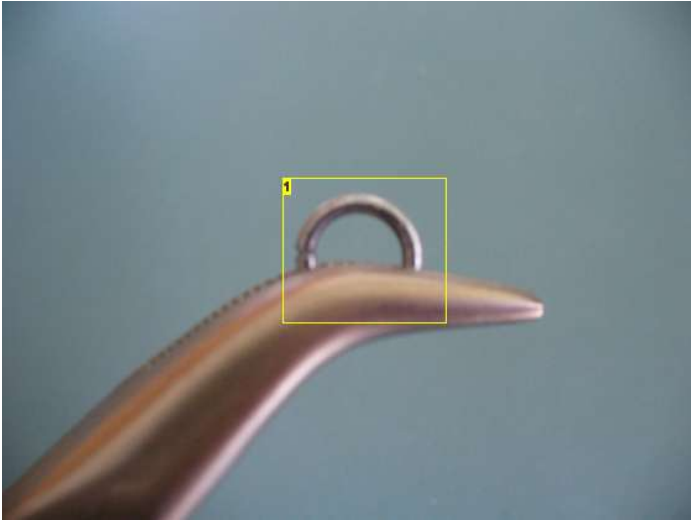


**Image Notes**

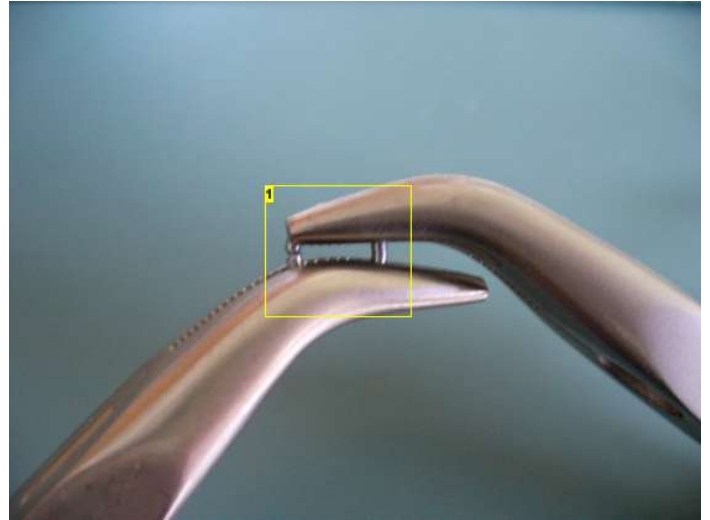
1. Container with ca 1000 rings. Always label them. If you make different sizes of rings this will come in handy

## step 2: Opening and closing rings

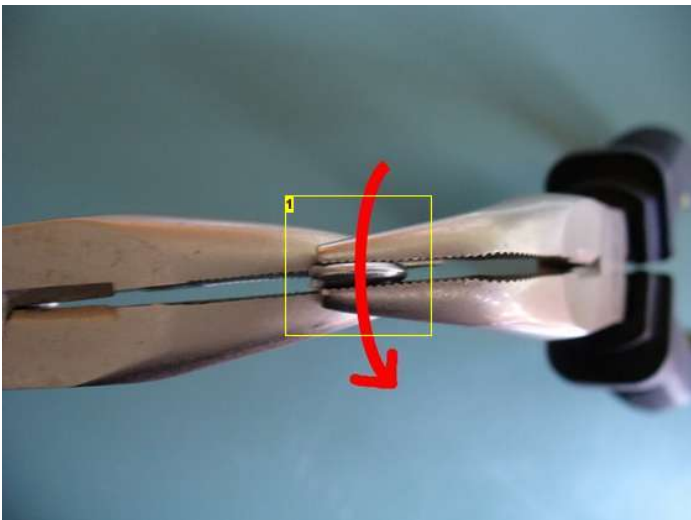
The first thing you have to learn is how to open and close the rings. This is usually done with pliers. I think the pictures are quite clear.



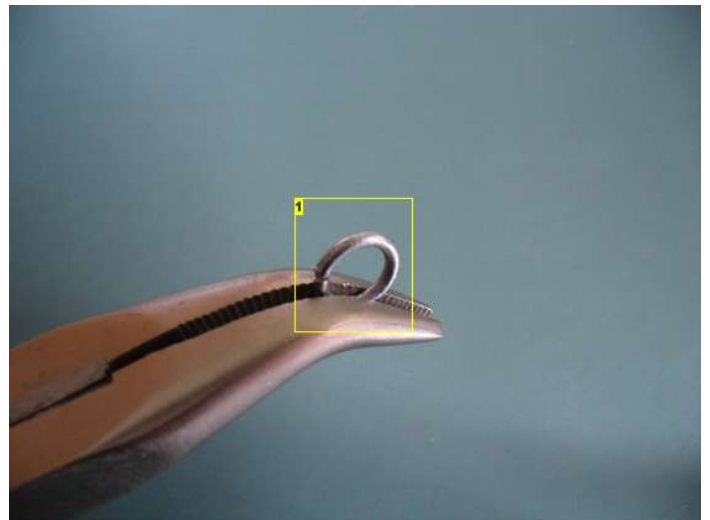
**Image Notes**  
1. open ring - side view



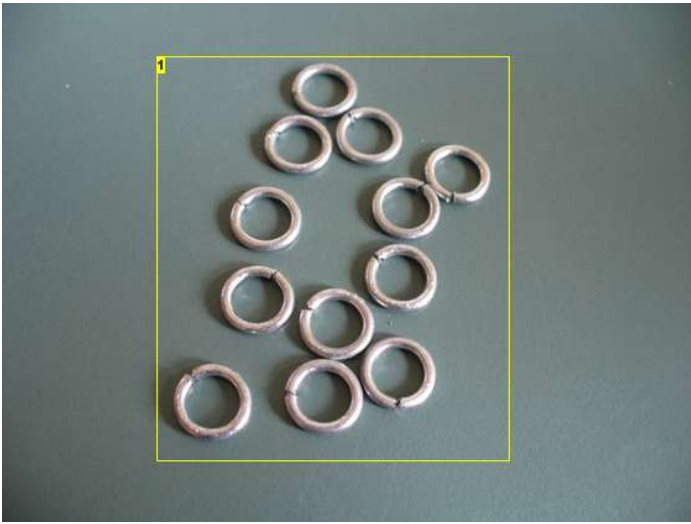
**Image Notes**  
1. how I hold the rings



**Image Notes**  
1. twist in the direction of the arrow to close th ring

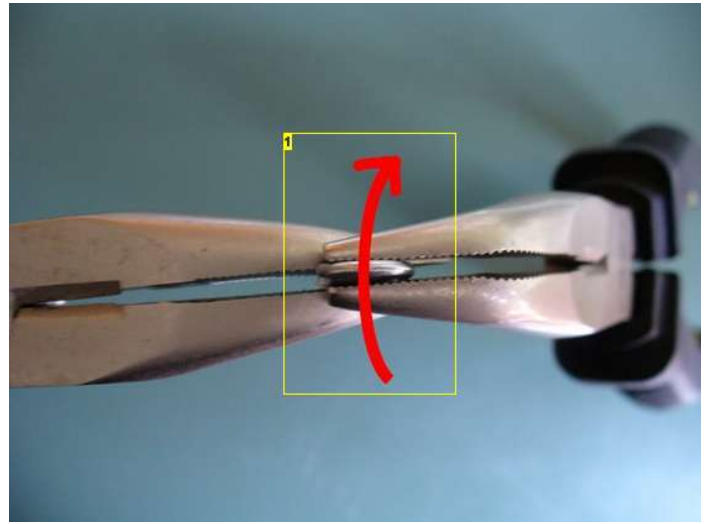


**Image Notes**  
1. closed ring



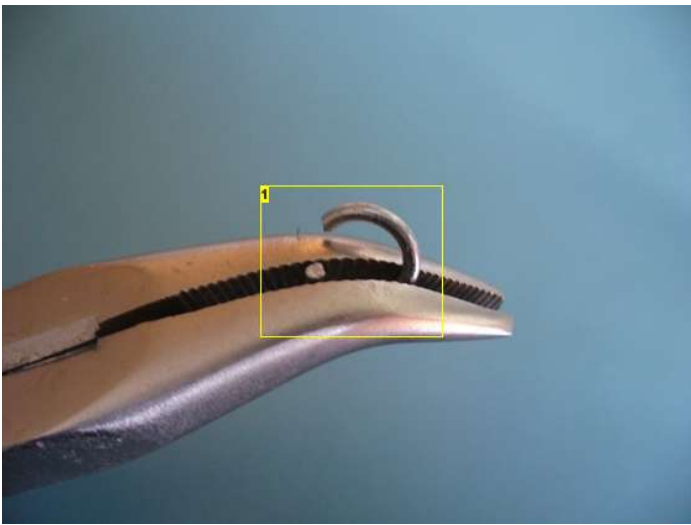
**Image Notes**

1. Some closed rings, you will need lots of them...



**Image Notes**

1. twist in the direction of the arrow to open the ring.

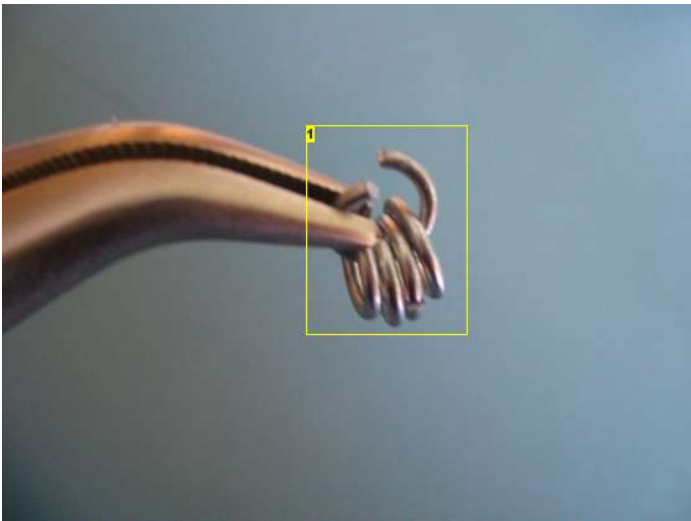


**Image Notes**

1. an open ring

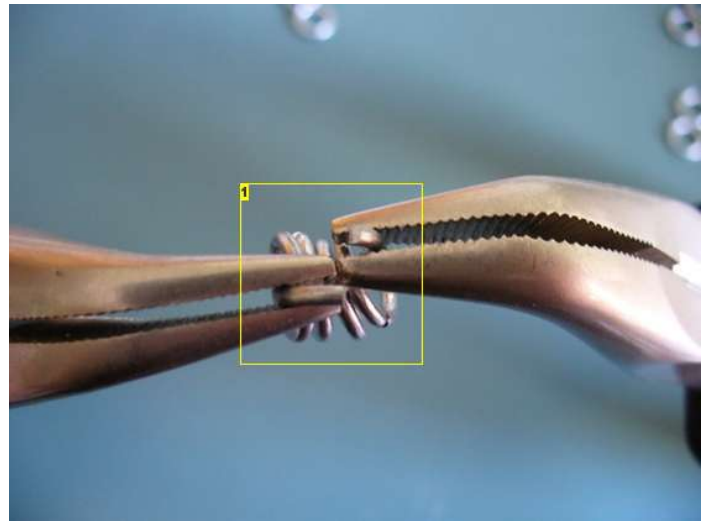
**step 3: Starting the first row**

Well, let's start connecting the first rings. The first 5 rings show clearly how "European 4-in-1" got it's name. 1 ring is always connected by 4 other rings.



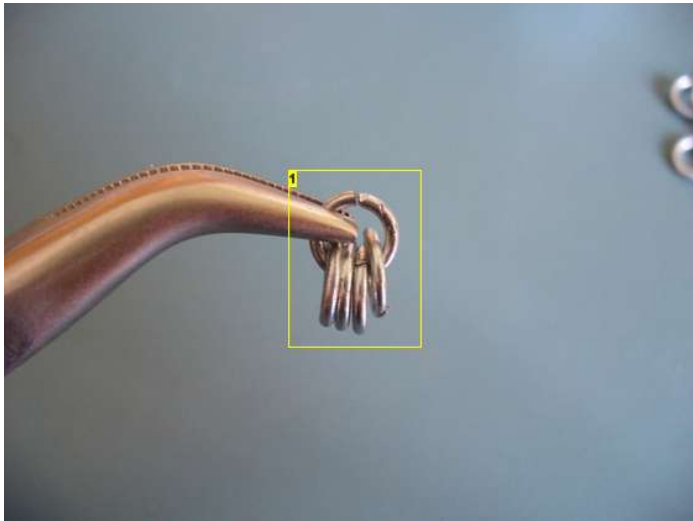
**Image Notes**

<http://www.instructables.com/id/European-4-in-1-maille-chainmail-speedweaving/>



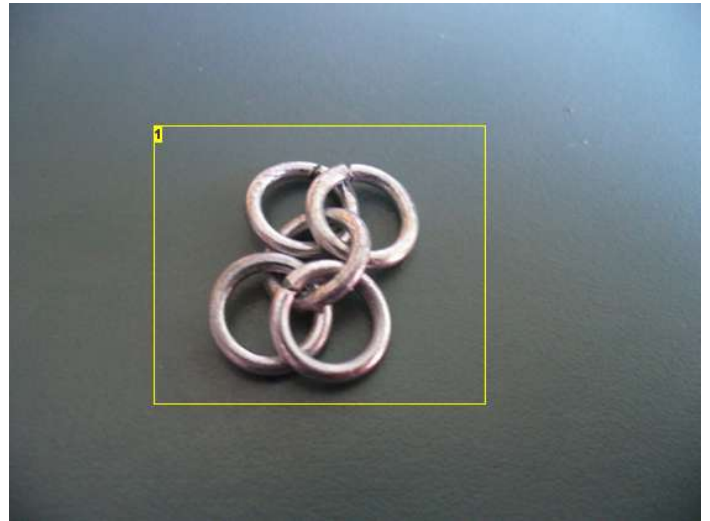
**Image Notes**

1. take an open ring and 4 closed rings



**Image Notes**  
1. the result

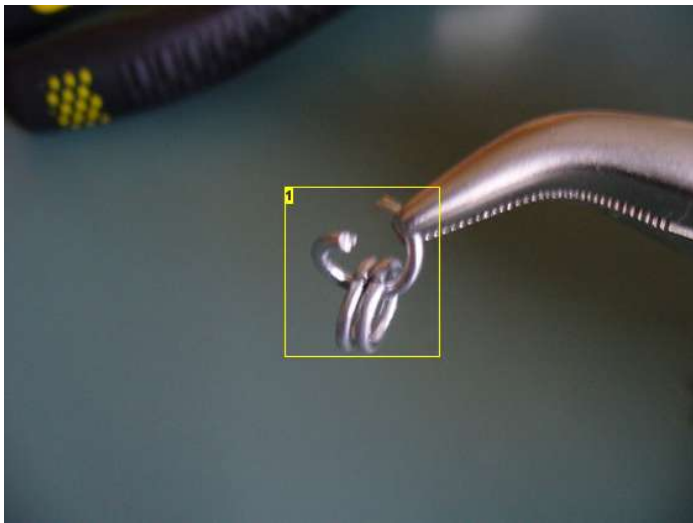
1. close the open ring. This was probably the hardest picture to take... a third hand would be handy ^^



**Image Notes**  
1. Lay your work down like this.

#### step 4: Continue the first row

The pictures show how to connect more rings to your first row.



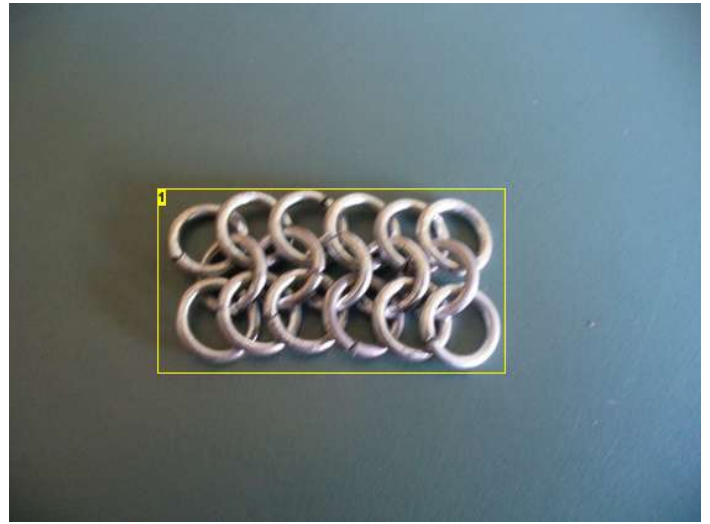
**Image Notes**  
1. take an open ring and 2 closed ones



**Image Notes**  
1. through here  
2. and through here



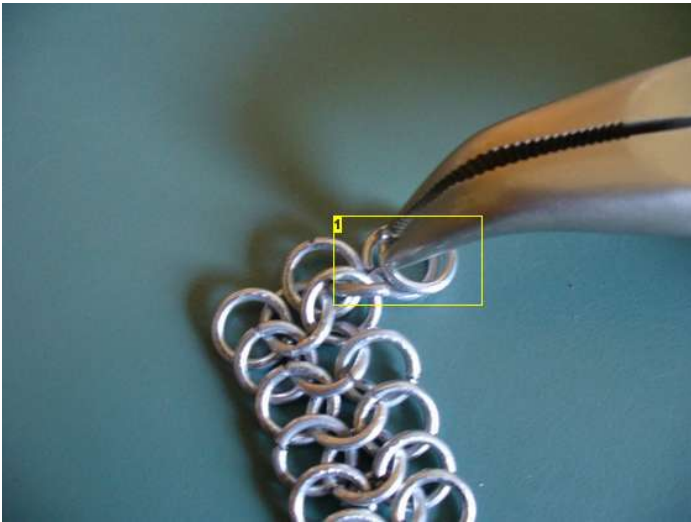
**Image Notes**  
1. isn't this beautiful



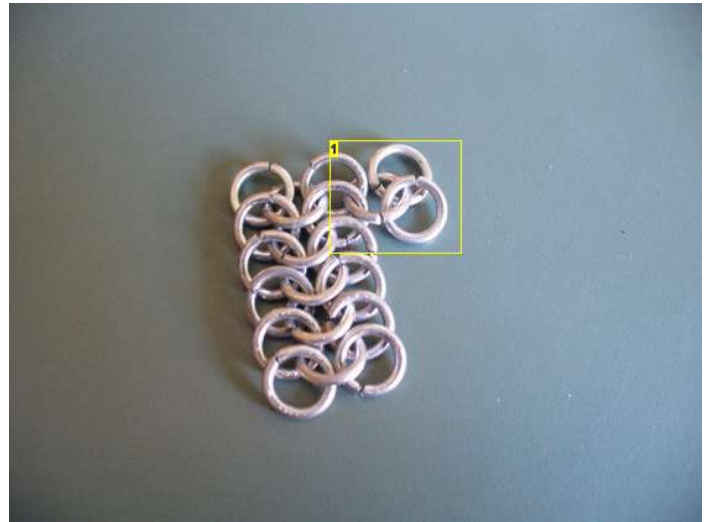
**Image Notes**  
1. short row

**step 5: The second row**

You have a first row. Well, let's start a second one.



**Image Notes**  
1. take an open and two closed rings and put it through two rings of your first row



**Image Notes**  
1. the beginning of a second row



**Image Notes**

<http://www.instructables.com/id/European-4-in-1-maille-chainmail-speedweaving/>



**Image Notes**

1. don't use this hole... yet



**Image Notes**

1. a ring comes here
2. and here

1. we'll link this later



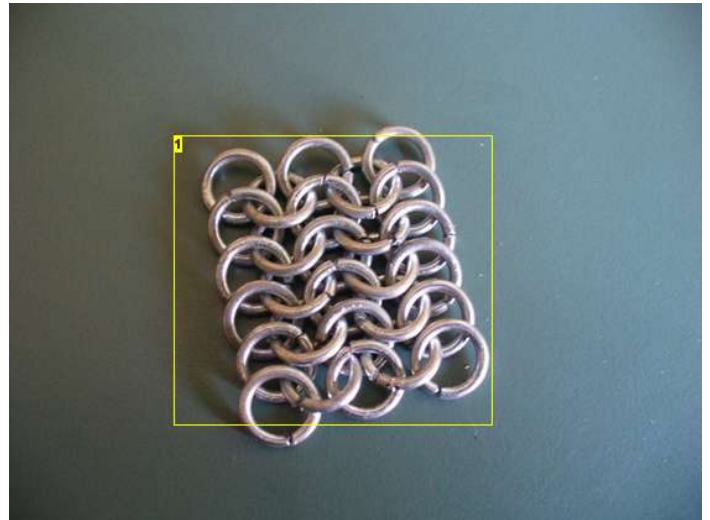
**Image Notes**

1. connect



**Image Notes**

1. look... a ring



**Image Notes**

1. your first sheet of E 4-1 is finished

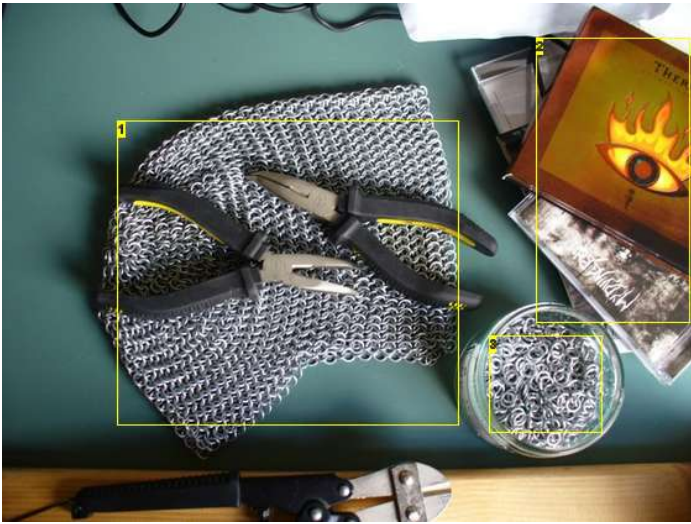
**step 6: Make something**

Once you can don this, you can make a lot of things. The only thing you will also need are contractions and expansions. But thats for an other time...

Or try making some really rocking Byzantine chain!

Here's a picture of the finnished coif and me... It took nearly 50 hours te make this one (making the rings and going to the hardware store to buy wire included)





**Image Notes**

1. the top part of the coif I'm making + pliers
2. Goooooooood music (Therion and My Dying Bride)
3. a lot of rings



**Image Notes**

1. Please ignore me look at the half-finished coif
2. A long time ago, I saw this picture on a site. I loved it, so I took some markers and a large sheet of paper. Now this is a poster on de door of my bedroom.



**Image Notes**

1. nearly 2,5 kg 6661 rings (counted!!!) almost 50 hours of work

