





# Electroplating

A presentation and demonstration  
For the Baton Rouge Woodworking Club  
By Geoff Michelli for the 1/7/23 meeting



# Disclaimer

I'm not an expert at this. I don't have any formal training,  
Nor did I stay in a Holiday Inn last night.

## Why?

I primarily use it when I'm restoring an old tool. I'll remove rust from small parts like screws. Once they're good and clean, I electroplate the parts with nickel. This prevents them from rusting.

## Safety note

When you're plating with electricity using the method in this presentation, it will create hydrogen gas.

Make sure to be in a well ventilated area.

We'll also be working with vinegar that will tend to get hot, so it won't be the most pleasant smell, and be careful of hot plating solutions.

# What you'll need

Nickel anodes - You can get them on ebay, amazon, etc... I've used [these from Amazon](#) with decent results. I suggest getting at least 4 or 5 of them.

Plain white vinegar - No fancy scents or anything else. The cheap stuff from the grocery store works quite well.

Power supply - If you plan on electroplating more than once, I suggest getting a decent power supply. I use one similar to [this one on Amazon](#). For experimenting, though, you can get away with a cell phone charger, or even a few D-cell batteries.

Alligator clips and wire - these will be used to connect the power source up to the object you want to plate.

Glass containers - I use Mason jars so I can seal them up and re-use the solution later.

# What you'll need

Funnel / filters - Occasionally, you might need to filter the nickel acetate solution. Coffee filters have done the trick for me so far.

Copper wire - You'll hang the parts you want to electroplate from the copper wire. You'll also need dowels or thin scraps of wood to suspend the copper wire across the top of the container.

(optional) Stirring pad - I haven't used one, but I've heard they are nice to use. It keeps the plating solution moving so bubbles don't form on the object being plated. I'm thinking of getting something [like this one](#), or maybe even one with heat.

# How

I'm only going to cover nickel plating, but the process can be used for many other metals like copper and zinc.

We start by making a nickel acetate solution.

Fill a glass jar mostly full with plain white vinegar. Add a pinch or two of regular table salt to increase the conductivity of the vinegar. Stir it to dissolve the salt.

Use 2 nickel strips. Hook one to the POSITIVE (+) side of the power supply, and the other strip to the NEGATIVE (-) side using alligator clips.

Suspend the strips on opposite sides of the jar of vinegar and salt. I usually use binder clips for this.

Turn on your power supply, set it to 12 volts DC, 5 amps and find something to occupy your brain for the next hour or two. Or... sit there and watch the tiny bubbles. When you have a nice green jar, you can turn off the power supply and you're ready to start plating!

**Safety note - the bubbles you see are hydrogen gas. This process can also heat up the vinegar solution, so be careful before you touch it.**



# A word about preparation

As with any other coating, like paint, powder coat, etc... the amount of prep work will have a direct impact to the end result.

Get rid of all the rust, paint, varnish, or whatever other gradoo is on the object you want to plate. I mostly plate small steel parts like screws and bolts. I'll usually hit them with a wire wheel on the Dremmel, then wipe it down with mineral spirits.

I've also used a sonic cleaner with gun cleaning solution, and that has worked well if the part isn't rusty. If you do this, don't use tap water. Use distilled water.

If you're feeling adventurous, you can try doing an acid wash with a diluted hydrochloric acid solution for a couple minutes. Make sure and rinse all the acid off with distilled water.

# The lingo, the positive, and the negative

In the electronics world, you'll typically hear the + and - referred to as the Anode and Cathode.

In the electroplating process, the Anode is the + side of the power supply. When the electricity flows, the Anode loses material and is picked up by the Cathode, which is hooked to the - side of the power supply.

If you confuse these and hook them up in reverse, you'll ruin the acetate solution, and likely the object you intended to plate. You'll have to start all over from the beginning, so make sure you hook things up correctly!

# Let's plate!

Time to start plating!

I usually use a strip of nickel that hasn't been used to make the acetate solution. Suspend as much of that nickel strip as you can in the green jar, but leave enough to hook up an alligator clip without touching the solution.

Hook the nickel strip (which is the Anode) to the POSITIVE (+) output on your power source.

Hook your cleaned object to be nickel plated up as best you can to some copper wire. Make sure you have enough copper wire to suspend your object roughly in the middle of the jar, and have enough copper wire to wrap around a dowel. Suspend the object roughly in the center of the jar, and hook it up to the NEGATIVE (-) on the power source.

# Let the electrons flow

You've got your anode in the jar of acetate solution as close to the side as you can reasonably manage, and your soon-to be plated object suspended in the middle.

DOUBLE CHECK THE POLARITY and make sure the nickel anode is hooked up to the + and your object is hooked up to the -.

Now, set your power supply to output to 3-5 volts. This will vary based on the volume of acetate solution, and the surface area of the part. A mason jar with 25-30 ounces of solution and a small screw to be plated only needs 3-3.5 volts. The same jar with a 2 inch 1/2x13 bolt will need more, probably around 4 volts. A dump truck full of solution with a Volkswagen being plated will need way more.

It's best to do some experimentation with similar sized spare parts. If the voltage is too low, bubbles will slowly form on the cathode, and will stick, resulting in a spotty coating of nickel. If the voltage is too high, the bubbles will be really aggressive and affect the finish. You have to find the happy spot in the middle.

If you're using a decent power supply, you can leave the amperage up high. It'll only draw what it's capable of drawing based on the conductivity of the solution.

Turn on the power supply now.

The plating process doesn't take long. Within a few minutes you should start see the nickel plate forming on your part.

Nickel is flowing from the anode to your part, so the plate will be thicker on the side that's facing the anode. After a few minutes, make sure and rotate your part so the other side faces the nickel anode and leave it there for the same amount of time.

You may have to change how your part is suspended in order to get an even plate. Make sure and wear gloves if you have to take the part out and touch it to change how it's suspended. The oils and skin particles from your fingers will ensure you have a bad end result.

Once you've got an even plate on all sides of your part, you can either consider it done, or add another coat for a thicker plate. Making several thin coats tends to work better than one thick coat.

Now, you've successfully plated a part with nickel!