

# RUST REMOVAL MADE EASY

## A TOOL COLLECTOR SHARES HIS LABOR OF LOVE

As a professor of archaeology, and an active tool collector, Missourian Jim Price sometimes manages to apply academic skills to his hobby—like removing rust with electrolysis. “For decades, archaeologists have employed the method to clean specimens without damage,” says Jim. (Read more about Jim Price in “He Makes Tools Sing Again” on pages 25–29.)

### Charging up for rust

According to Jim, his rust-removal technique depends on producing a chemical change (removing rust) by passing an electric current through a non-metallic conductor. To translate that into application, you’ll need a common battery charger (about \$20 at auto-supply stores) to supply the direct current. Then—for the conductor—mix a can of lye (about \$2 for 12 oz. at grocery stores) to three gallons of cold water.

For the terminals—the negative cathode and the positive anode—of the electrolytic cell you’re creating, use ferrous (derived from iron) metal rods, such as concrete-reinforcing rod. The container must be made of plastic or glass. Gather up some flexible iron wire, a scrap board long enough to rest on the container, and you’re ready to start.

### Zap away corrosion

Jim recommends operating your rust remover outdoors. “Not because the fumes are toxic,” he says, “but because they really smell bad.” And be sure that the tool(s) you’re going to clean do not have a zinc plating or brass parts. Zinc will dissipate through

the solution and cover everything, and brass gets discolored. Also, remove wooden parts.

To support the metal terminals in the bucket, drill two holes in the board the same diameter as the terminals, one near each end. Then insert the terminals.

With a wrap of wire, attach the rusted tool or parts of a tool to the bottom of the terminal you designate as negative. Next, place the terminals and attachments into the bucket containing the lye/water mixture.

Start the process by connecting the negative (black) lead of the battery charger to the negative terminal and the positive (red) lead to the opposite one. Set the charger to low-amp charge (2 amp or “trickle” on a 12-volt instrument). Next, plug the charger cord into an outlet.

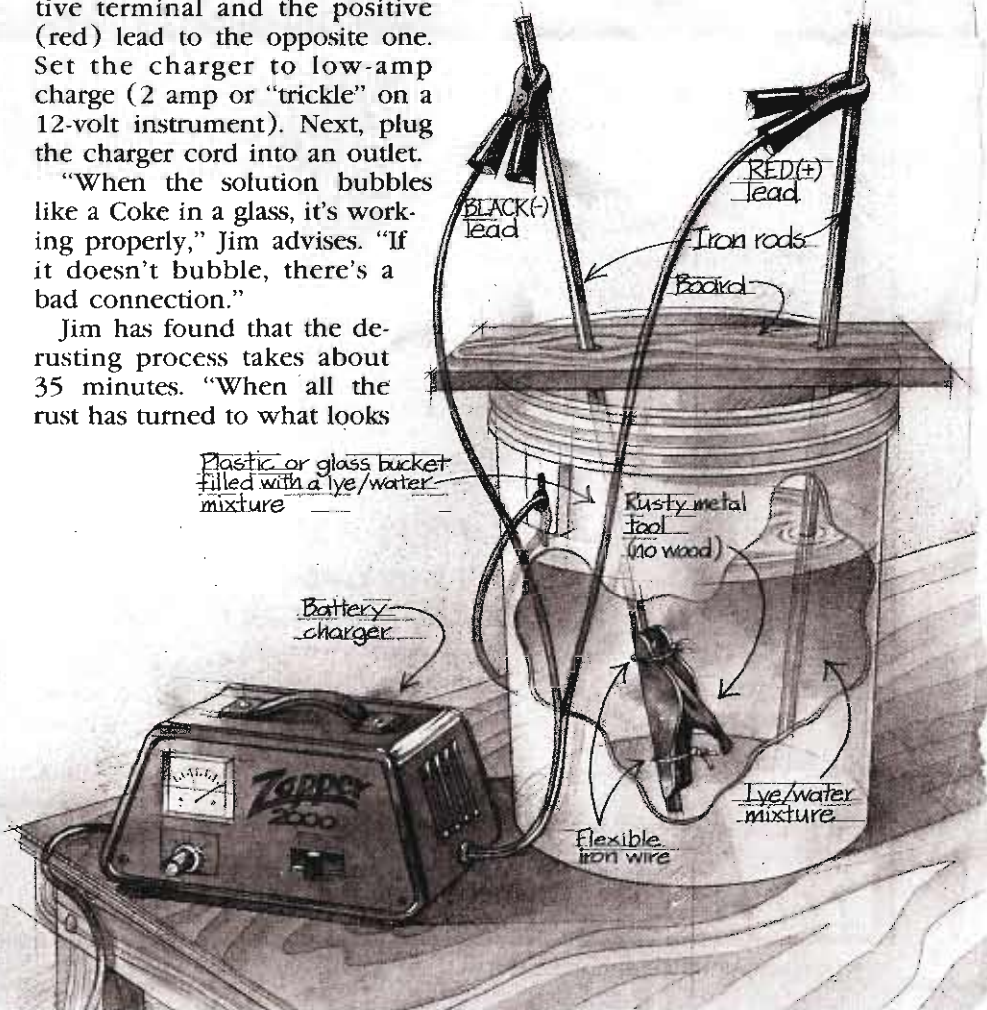
“When the solution bubbles like a Coke in a glass, it’s working properly,” Jim advises. “If it doesn’t bubble, there’s a bad connection.”

Jim has found that the de-rusting process takes about 35 minutes. “When all the rust has turned to what looks

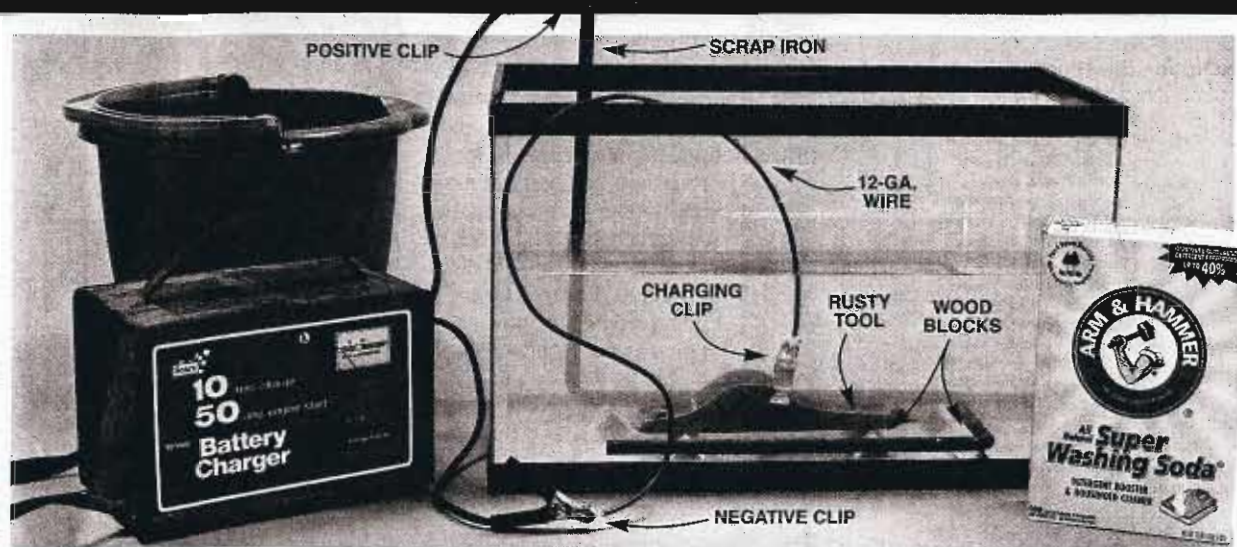
like a black powder, it’s done,” he notes.

After stopping the electric flow and removing the charger leads, Jim pulls the still-attached tool from the solution and rinses it quickly with a garden hose (gloves keep the weak but caustic solution off his hands). “Then, rinse it real good with boiling water,” he says. “You also can wire-brush the metal very lightly. If there are any stains left on the metal where the rust was, remove them with a buffing wheel and jewelers rouge. Then, rub with oil.”

Illustration: Brian Jensen



# QUESTION & ANSWER by Bruce Kieffer and Richard Tendick



## ELECTROLYSIS CLEANS RUSTY TOOLS

**Q** I've heard there's an easy way to remove rust from small tools using a battery charger. How does it work?

**A** Electrolysis is a gentle, safe way to chemically remove all the rust, leaving the iron untouched. An abrasive can remove rust, too, but it may require removing a large amount of metal, either weakening the piece or destroying its value.

Here's what you need: A small battery charger, a plastic or glass container, washing soda (available in the laundry-detergent aisle at grocery stores), scrap iron, a charging clip and a couple feet of wire.

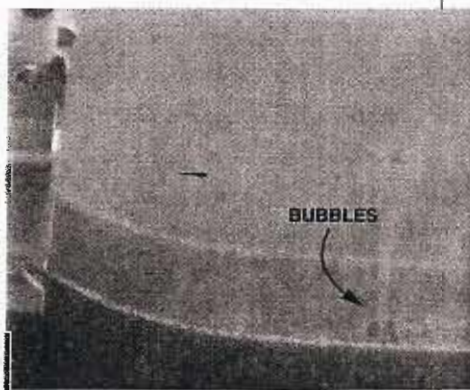
Here's how it works: Follow the setup in Photo 1. The tool gets a negative charge and the scrap iron gets a positive charge. The rust flees from the negatively charged tool and is attracted to the positively charged scrap iron. The cleaning action occurs only in a line-of-sight manner, so it's best if the scrap iron surrounds the tool. When you've wired the tool and scrap-iron rod, plug in the charger. The lowest setting is all you need. Bubbles mean it's working (Photo 2). Eventually, a reddish brown crud will appear on the water's surface (Photo 3). When bubbles no longer form on the tool, you're done. Clean the tool with water and a gray 3M finishing pad. Treat your restored tool to a coat of rust-inhibiting wax or spray.

### SAFETY CONSIDERATIONS

Electricity and water can be dangerous. Keep the charger away from the water in case of an accidental spill. Unplug the charger prior to placing your hands in the water.



**1** Electrolysis is not a complex operation. Mix one tablespoon of washing soda in one gallon of water. Pour this solution over the tool until it is covered. Hook the charger's black negative clip to the tool using a length of 12-gauge wire and a charging clip. This keeps your charger lead out of the soup. The red clip must be hooked to a portion of scrap-iron rod that is *out* of the water, because it would be eaten away in the water. Wooden blocks suspend the tool so the bottom gets cleaned as well.



**2** Bubbles indicate the process has started. Now all you have to do is wait until the bubbles stop. This plane iron took a day and a half.

**3** The orange crud on top is all that rust fleeing from the negatively charged tool to the positively charged iron rod. This is a good thing. It looks terrible, but this nontoxic sludge can be poured down the drain.



RAMON MORENO (4)