Hints & Kinks

04 Strip – Part 1

Hints & Kinks

For electrical artifact conservation and restoration.

Prepared February/March – 2017

First presented at Antique Radio Charlotte - 2017

Robert Lozier – KD4HSH
Monroe, NC – USA
kd4hsh@carolina.rr.com
704-283-2638

704-458-1076 - cell

Agenda for Hints & Kinks.

1. Call for presentation items from the audience.
2. Lozier filler for this time slot.
3. Closing discussions.

Do you know about Mama Stamberg's Cranberry Relish Recipe?

Susan Stamberg

You really should try it!

Preparing Mama Stamberg's cranberry relish.

Here is my perpetual (until I croak) ritual call for you to **TRY** the following simple modification to your band saw, you will **LOVE** it.

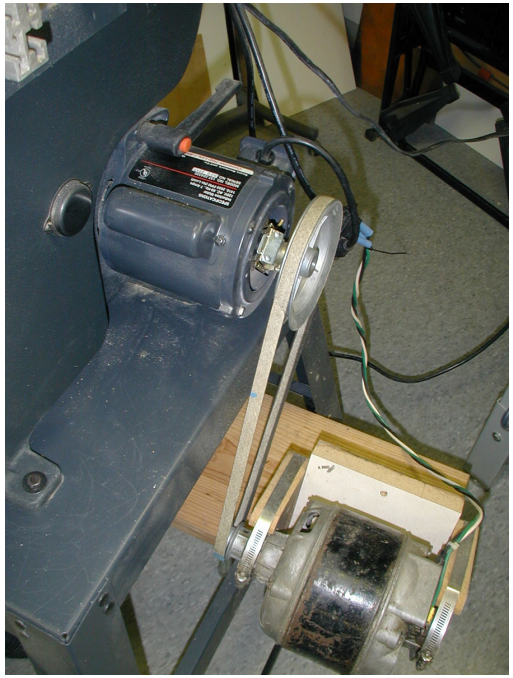
You need useful tools.

This is the **best** modification I have ever made to a shop tool that gets constant usage in my shop.

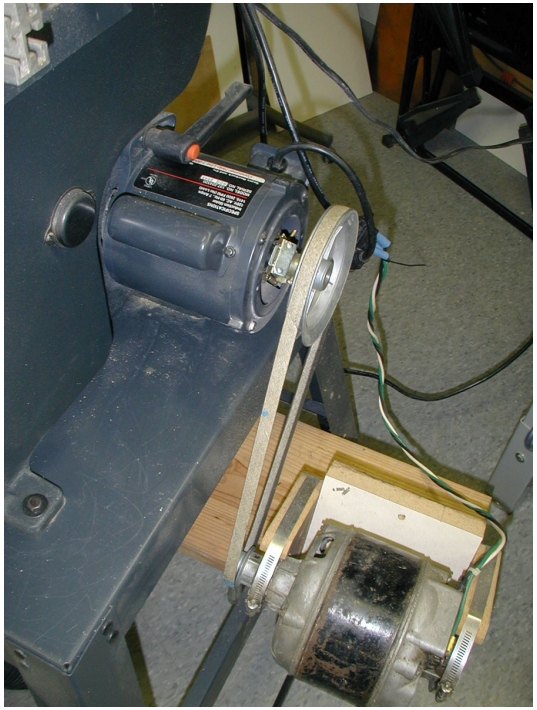
Slow down a wood cutting band saw so you can cut soft metals, Bakelite, fiberglass, plastics, etc. by adding an extra motor salvaged from an old washing machine.

This pulley set reduces the saw speed by a factor of 2.5.

If you can, look for a two speed motor. That should allow you the option of a 30% slower speed; helpful for sawing thicker metal.



No modifications to the saw required; just add this extra motor salvaged from an old washing machine.



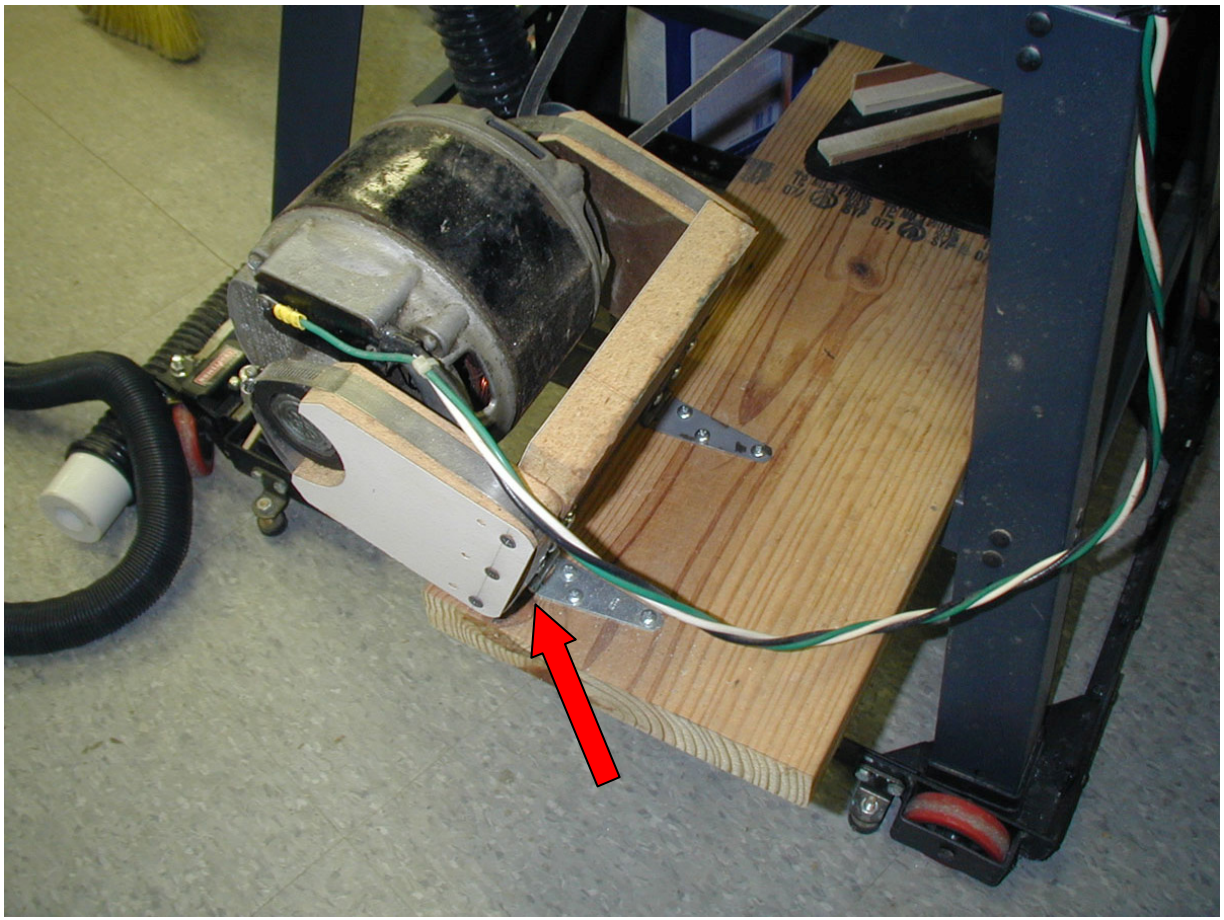
Unplug built-in motor from its power switch.

Remove fan cover from built-in motor.

Remove fan blade.

Install large diameter pulley.

Fabricate a cradle for your salvaged motor.



Simple strap hinges allow the motor cradle to pivot freely.

Stainless Steel heavy duty hose clamps secure the motor to the cradle.

Install **14 tooth** per inch bands specified for cutting non-ferrous metals. They work great for precise cutting of wood, Bakelite, plastic, fiberglass, brass, aluminum, mild steel and Corian. These same bands are destroyed almost immediately in these materials if run at the speeds of the saw as normally configured for general purpose wood cutting. I almost never need the higher speed from the original built-in motor.

Scratch free micro abrader for little rust and corrosion spots.

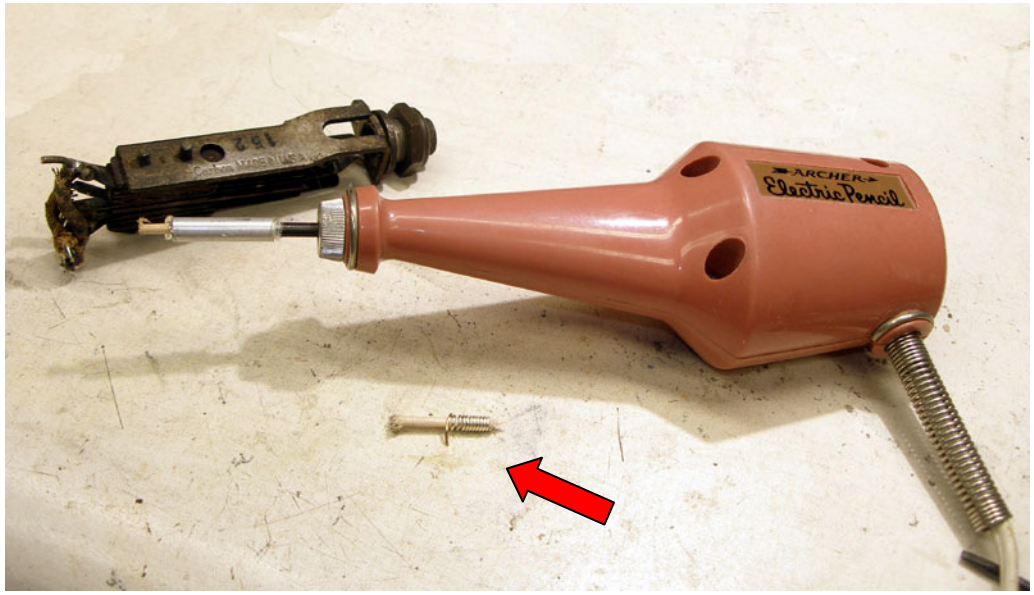
Got an old ‘buzzer’ type engraving pen gathering dust?

Find a aluminum spacer about ¾” long with internal thread of 4x40.

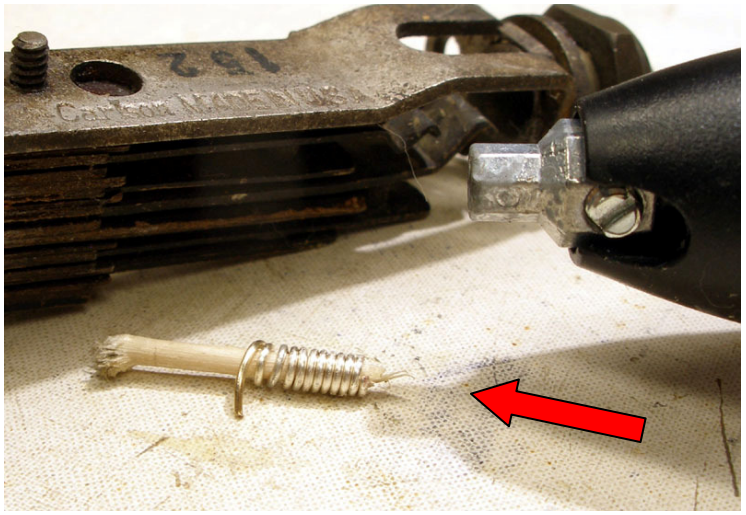
Drill out the spacer **part way** to the diameter of the engraver point .

Heat the spacer and force a little hot melt glue into it, then slip onto the engraver point.

Take a length of toothpick and wrap with small buss wire so as to make it fit snug in the spacer. You are good to go.



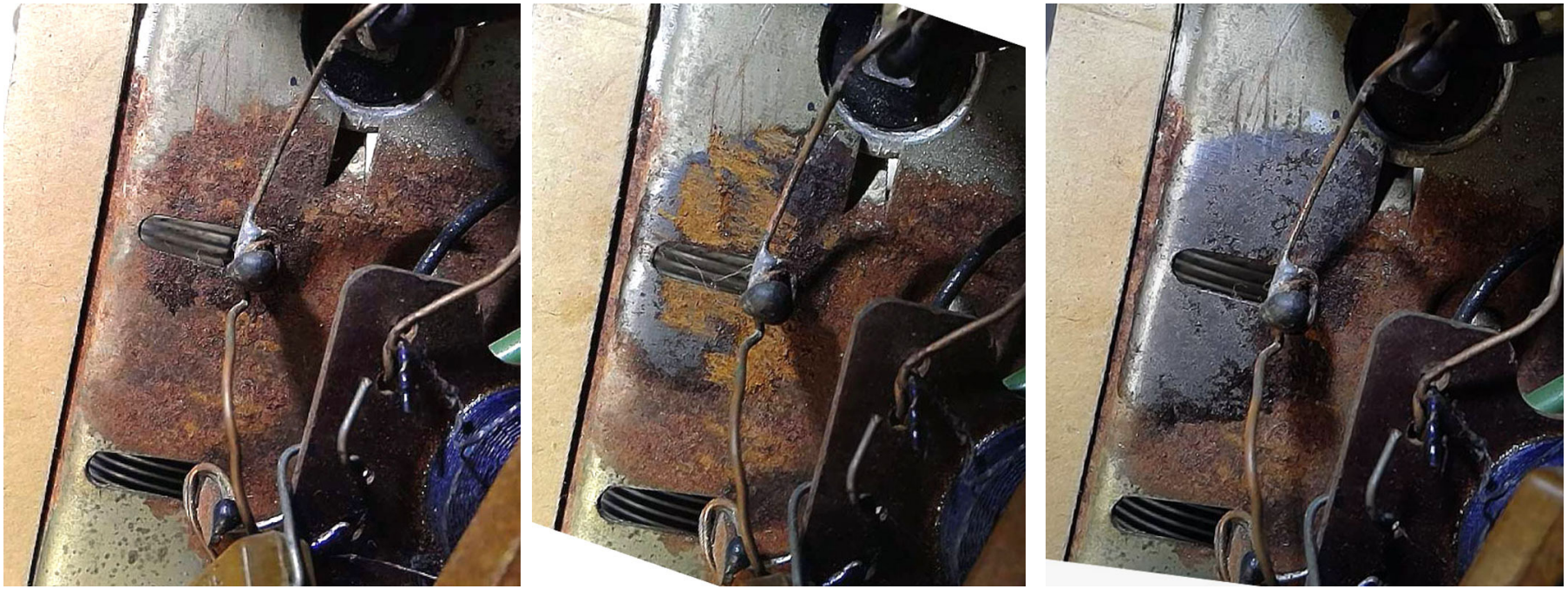
40 year old Archer brand engraver tool from Radio Shack.



Wrap the toothpick with buss wire to fit snug in the tool. The wire will easily slip onto a new pick.

A drop of rust converter or wet rottenstone applied to the toothpick works **great !**

This new Dremel tool is more comfortable to use than the 40 year old Archer tool.



The near vertical impact motion of the engraver tool almost guarantees no visible scratches that you will often get when using a rotary tool. Tilt your tool a little to get more aggressive abrasion.

The small size of the toothpick head allows you to work much closer to delicate features you need to preserve.

The toothpick can be replaced with **1/8” diameter fiberglass rod** for really aggressive cleaning; or the **paper stick of a ‘Q-Tip’** for very delicate cleaning.

Washing wiring? **Don't start** with water. Go **ballistic!** with mineral spirits **first**.

Cloth covered cables to loudspeakers, line cords, etc. can be loaded with soil. Cleaning them in place with vacuum, brushes or solvent rags do not work nearly as well as this…..

Place the cords in a shallow pan outdoors and pour in mineral spirits (white spirits). Saturate the cords with the solvent using a brush. (No need to scrub with the brush.) It can often look as if nothing at all is happening.

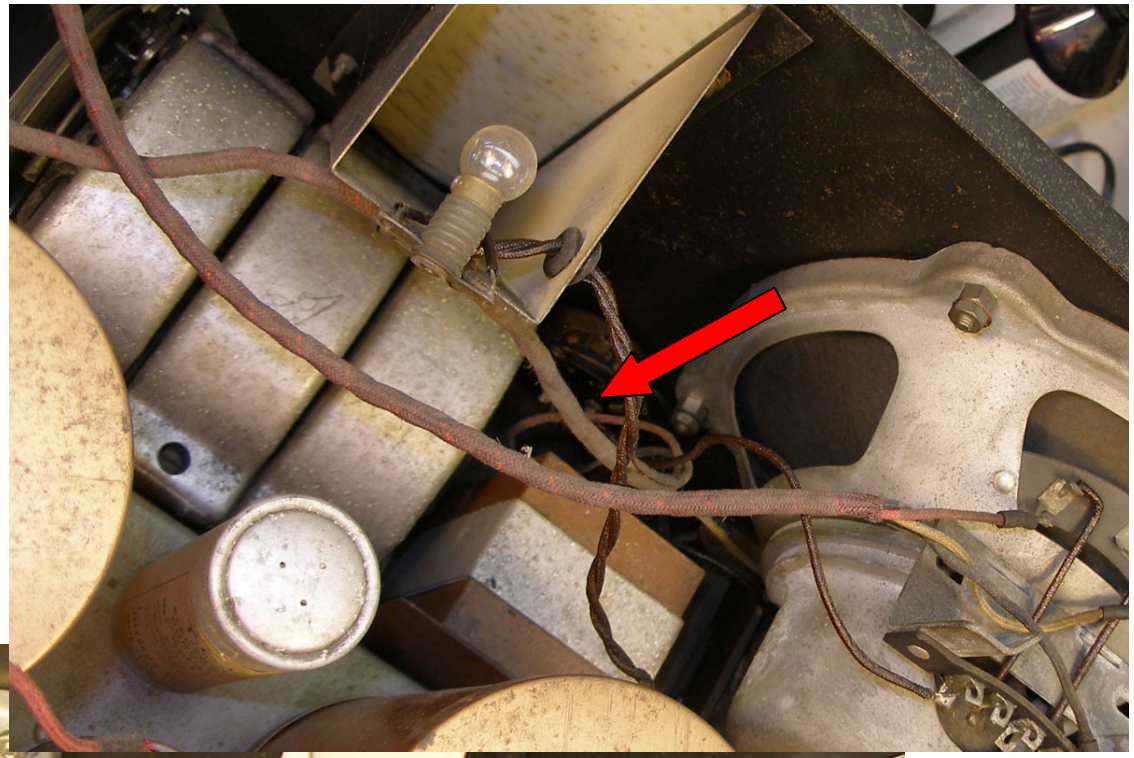
The secret to the process is to expel the solvent **in a cloud of aerosol** with **compressed air**.

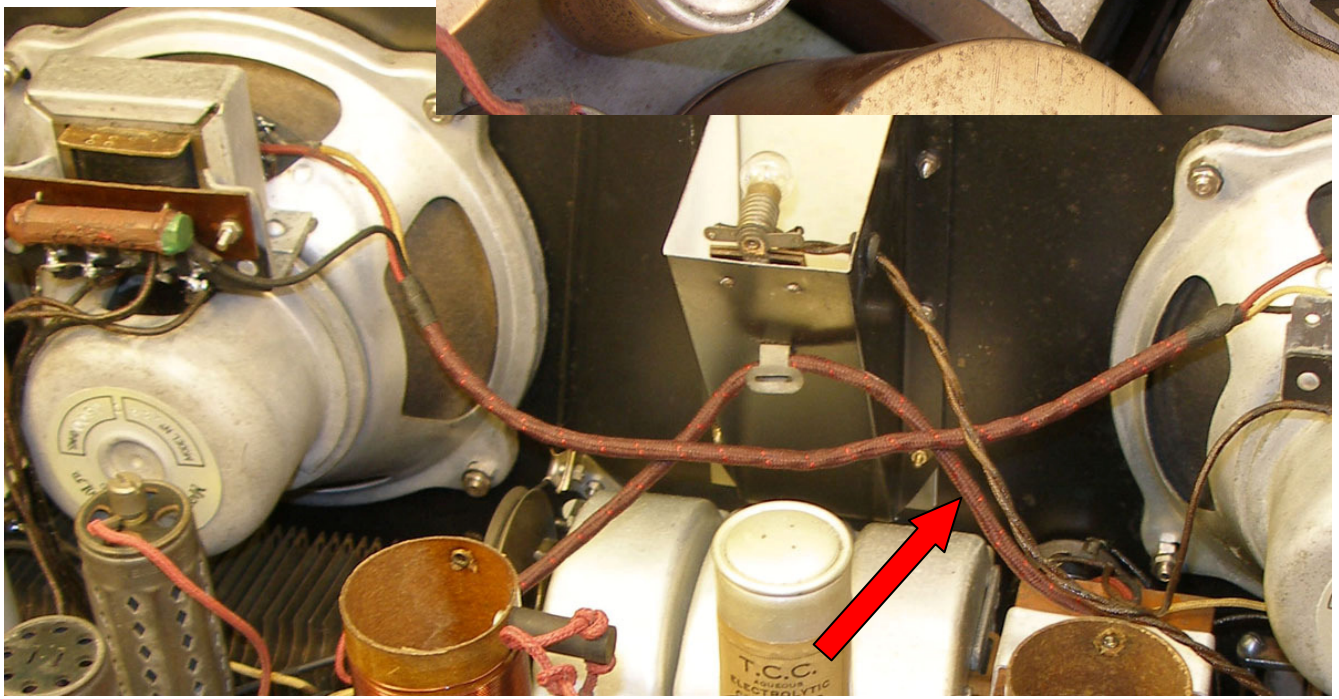
I set my blow gun air supply at about **30 p.s.i.** (Too high a pressure can damage old coverings.) Repeat three times and allow to dry. **It's quick and easy.**

Filthy cords can come out looking almost new.

If there is soil remaining, you can remove it with soapy water in your cleaning setup.

Some types of wiring look better with a light coat of shellac afterwards.

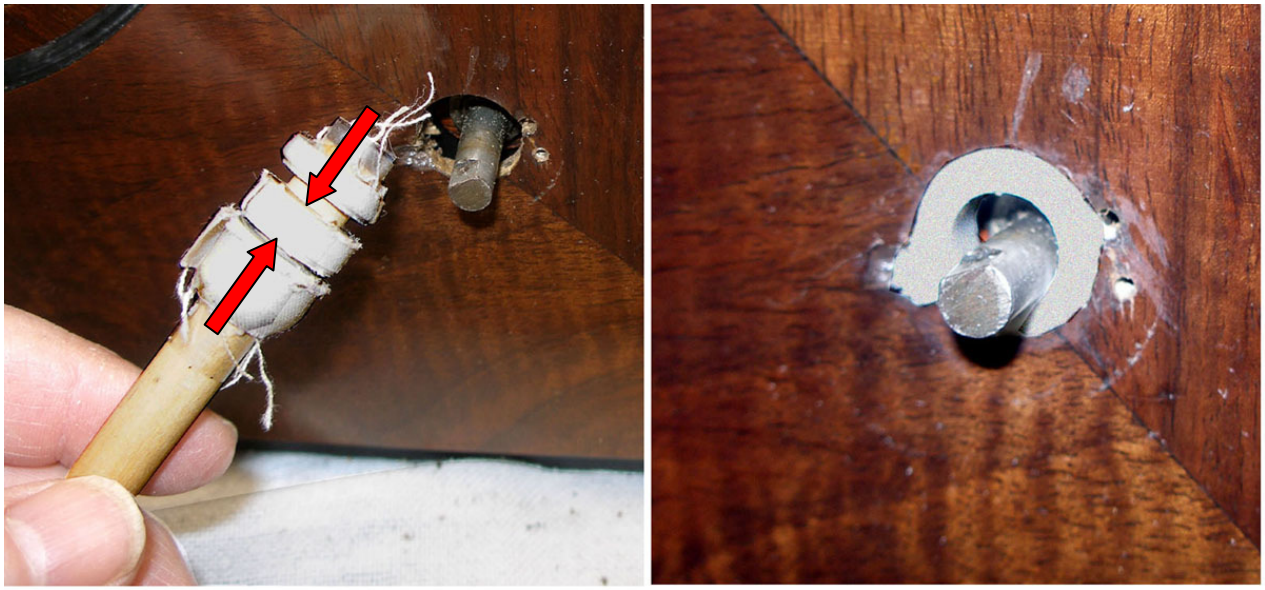




Bushing around knob hole.

Tiny screws or nails are fastening a bezel very close to a cabinet hole. The wood breaks away leaving no sound material to anchor the screws or nails.

Solution: Create a fibrous bushing that **will not** split and inlay into the opening.



Wrap dowel with polyester film. Wrap cotton sheeting around dowel while saturating with thin CA adhesive. After cure, cut bushing to proper length and glue into hole. Paint if necessary. Screws or nails will now have a durable split resistant anchor.

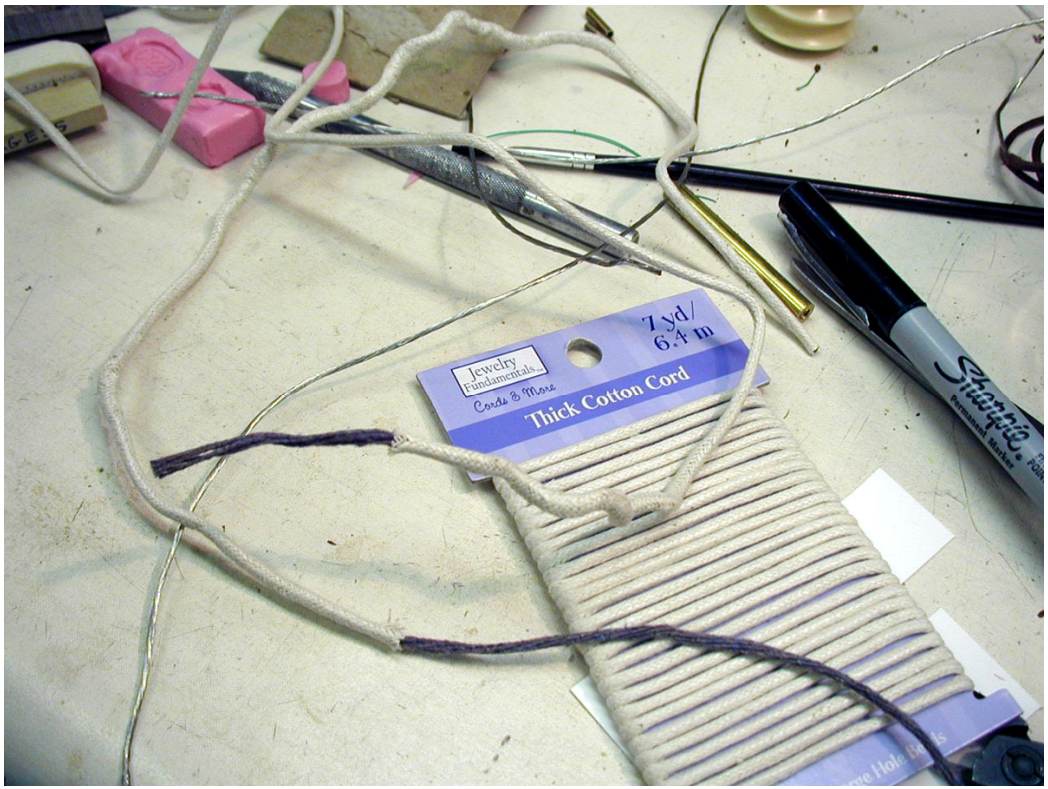
Make replica wire.

Craft stores have this thick cotton cord in their jewelry making supplies.

Available in black; or white that you can dye.

The braid has a denim thread core that simply pulls out.

You insert bare or insulated wire to duplicate wiring found in old electrical devices.

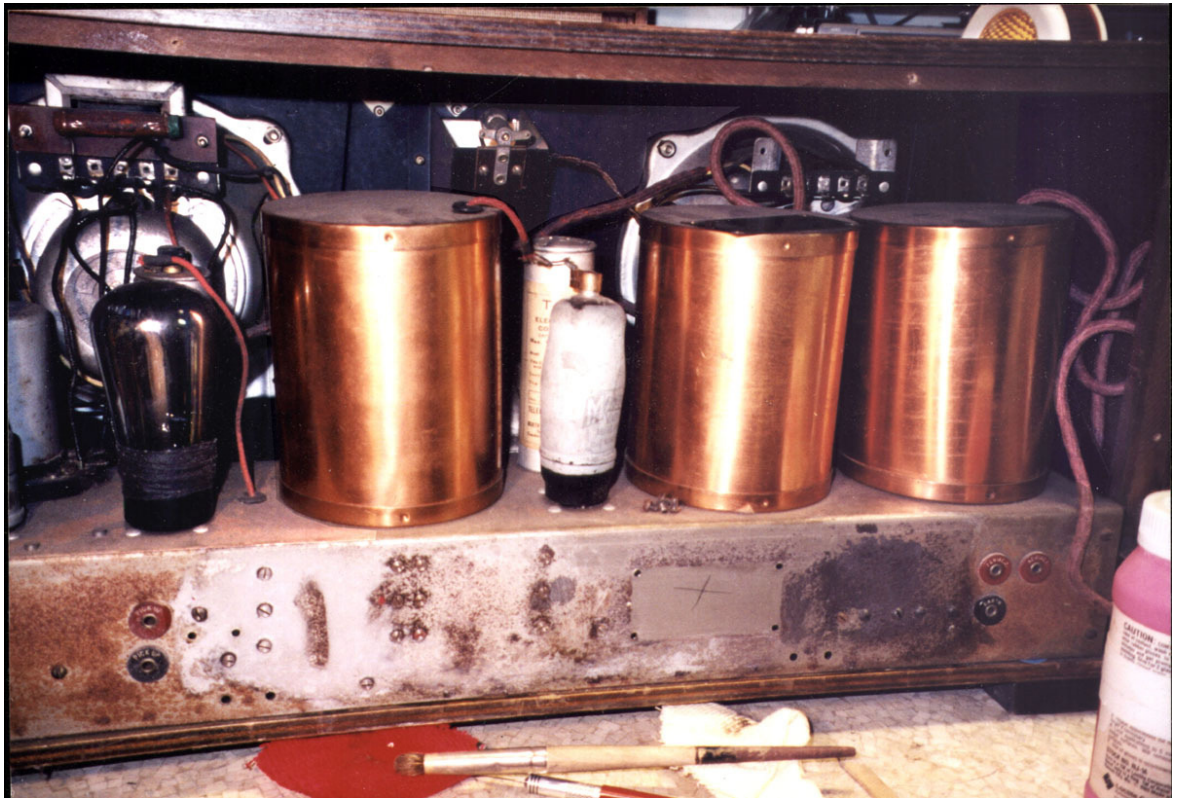


There is a **very small** version that is useful when repairing vintage coils in headphones and pin driver speakers.

Need 18 or 20 gauge solid copper wire? It is still the standard for thermostat wiring; available in 4 to 8 circuit cables sold by the foot at your local home improvement store.

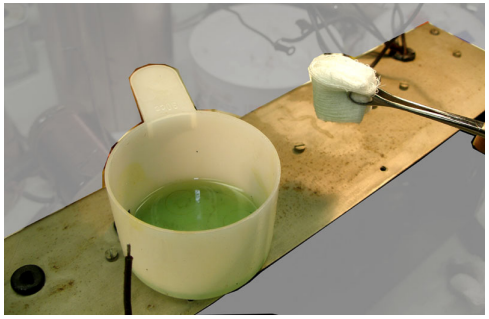
The problem: Part of a plated chassis looks really bad but the rest of the chassis is OK.

My solution: Use mottled paint top-coats on newly painted surfaces to **reduce the apparent contrast** to original surfaces.



This 1995 rust removal attempt was a miserable failure on this circa 1933 British set, the McMichael Twin Supervox.

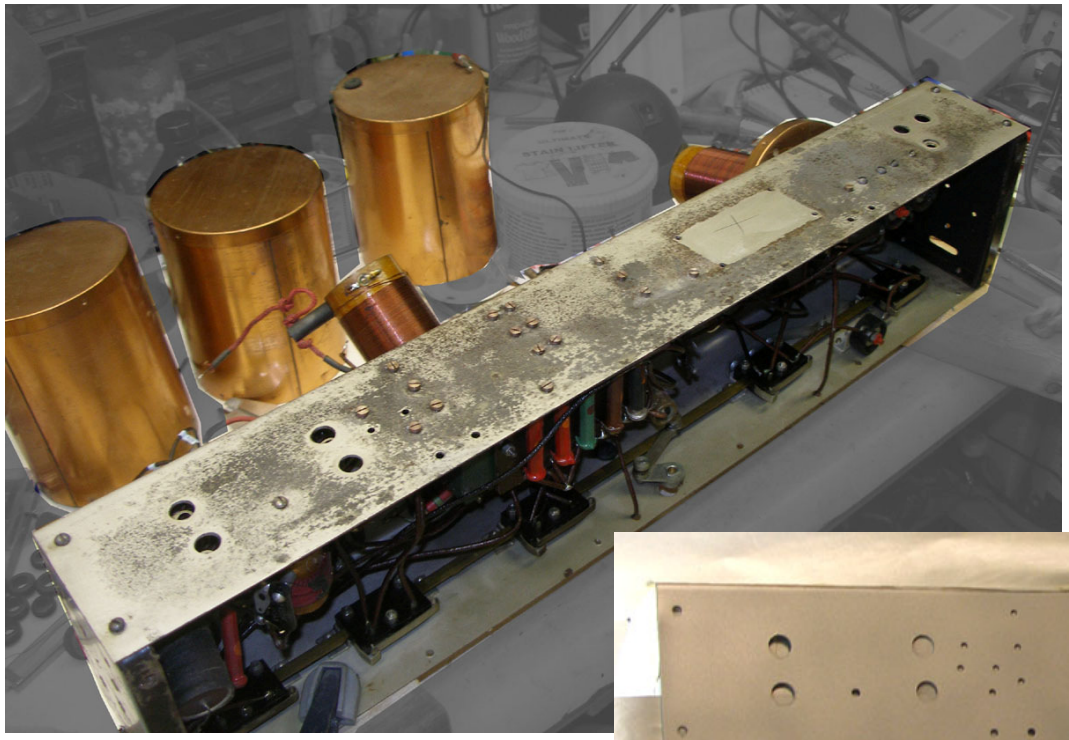
The other two sides of this satin nickel plate chassis were almost free of rust just needing only a good cleaning.

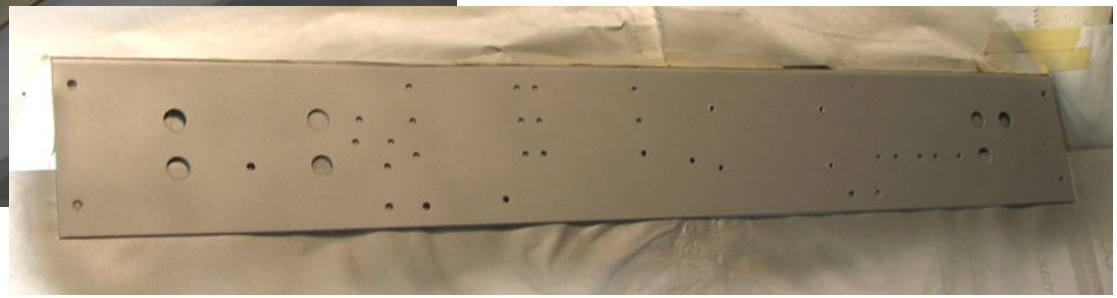


Use ‘rust converter’ to go after light rust on nickel plate.

After **ANY** cleaning of metal parts, finish by complete rinse and **force dry**; ending with a clear coat of satin lacquer or acrylic.

Dig out all the rust and fill metal with auto body glazing cream and sand flat.





Your paint job is going to look **way too good**.

Paint your chassis and a scrap the same way. Then experiment on the scrap using a mixture of acrylic paints applied '**artistically**' with a gauze or terry pad. (In this case a blend of silver, gold and flat black.)

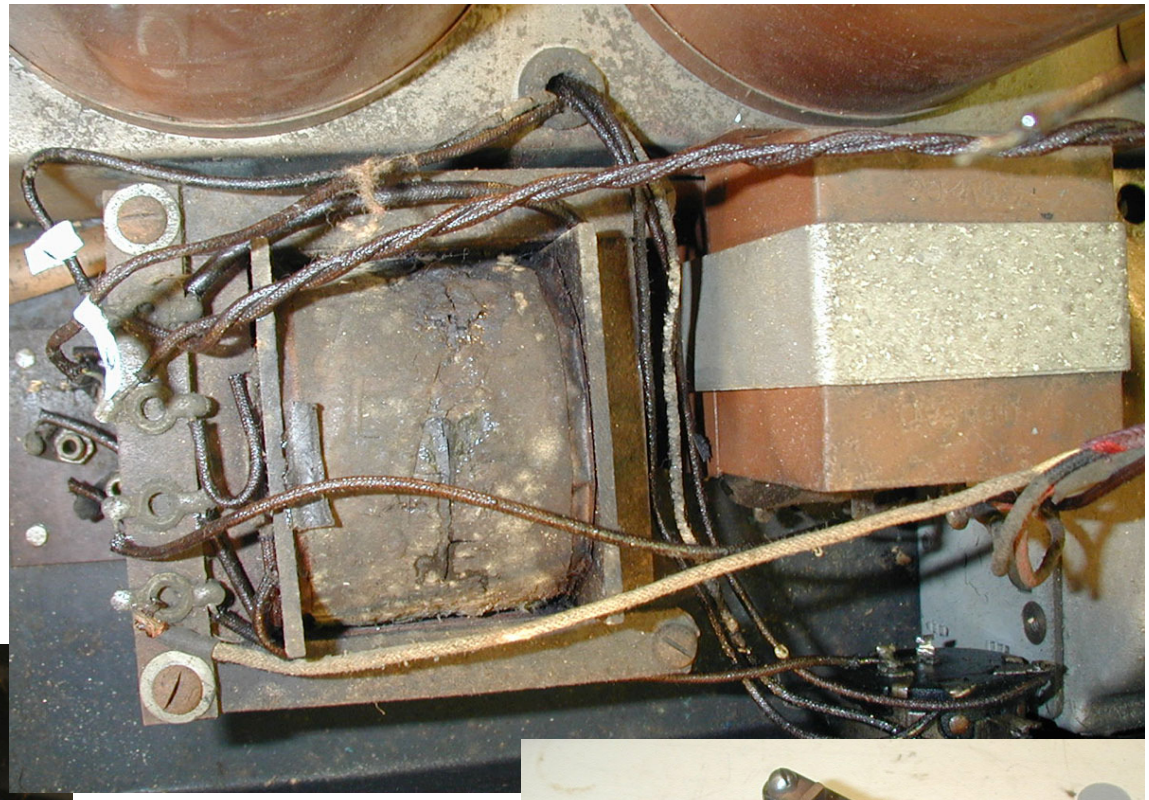
When happy with the results, apply a clear satin coat.

The goal is to **reduce the contrast** between the **old** and **new** so that the viewer is not side-tracked from the history exhibited by the artifact onto issues of what may have been done to make it presentable.

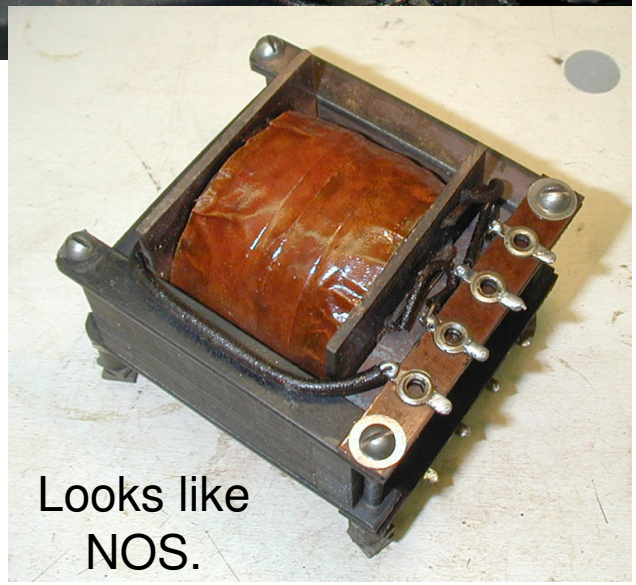
Moldy paper tape falling off. Replaced with new kraft paper tape.

Modern transformer varnish has a red stain…looks wrong.

Mixture of PVA veneer glue and wood dye gives really good vintage look.



My heat test shows no short term discoloration at 250 to 300F. Don't know about long term use.



Looks like NOS.

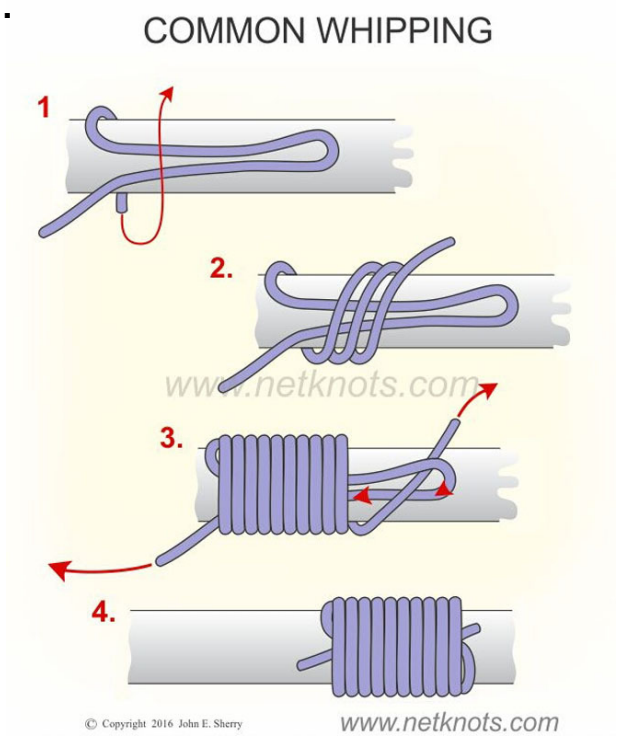
Got a vintage set with an old cloth covered line cord? Is it hard and bent helter-skelter?

When I find early radios that appear to be **essentially exactly as they left the factory**, I choose not to put in new parts just to make them work for a little while longer. **I value them more as a record of the technology of the day.**

This line cord is original to this Silvertone and I want to retain it but it needs to be coiled in an orderly fashion.

Use an adjustable temperature hot air gun to slowly heat the line cord. The hardened rubber will soften and allow you to guide the cord into orderly loops. Just be sure to use the minimum heat necessary.

Take the time to ‘whip’ frayed line cords, speaker cords, headphone cords, etc. to slow deterioration.



Whip using **embroidery floss**.

Saturate whipped area with **Dritz ‘Fray Check’** PVA glue available in store ‘sewing notions’.

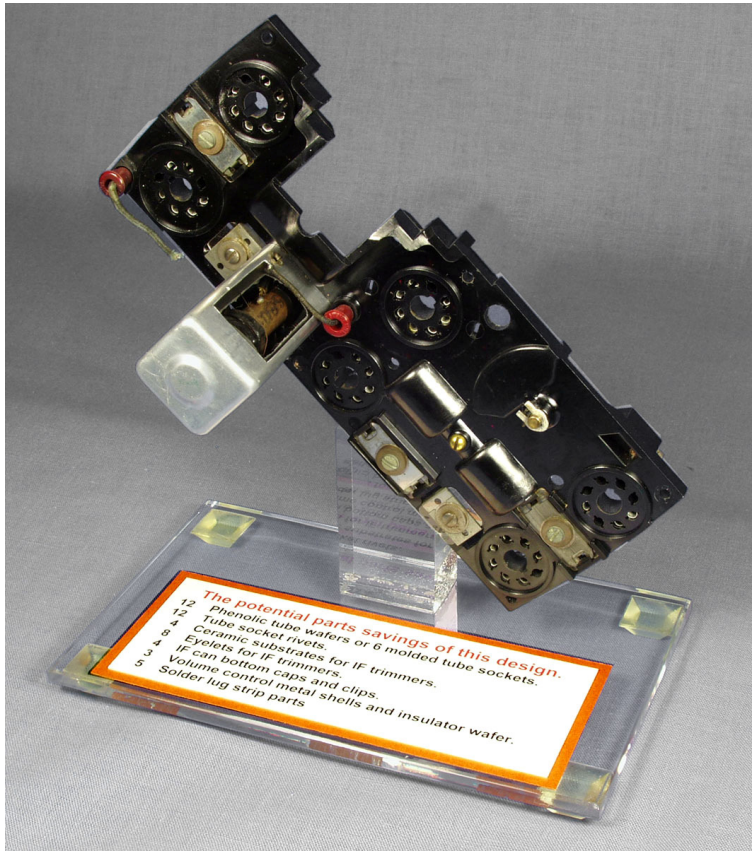
Use spare parts to illustrate interesting design features not evident from the outside.

1940 Zenith Bakelite chassis.

This was a bold attempt to use a sophisticated molded part to eliminate many small fasteners and stampings.

However this part is **too fragile**. Too much breakage in assembly and during shipment. No viable way to rework the very expensive molds to make the part more robust.

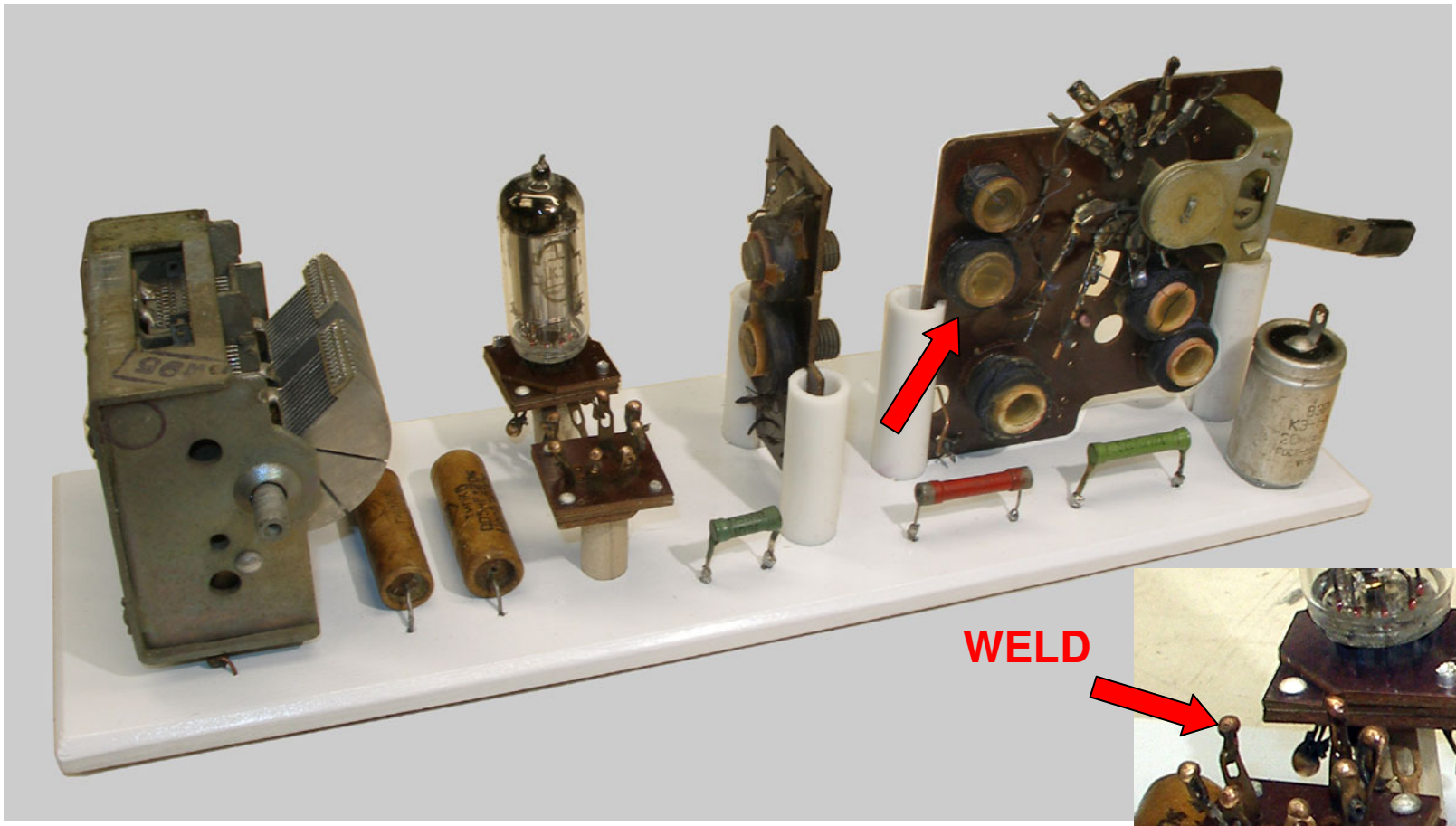
Production abandoned after about five months.



Tidbit: Zenith researchers, Bryant & Cones report that Commander McDonald's personal files appear to be completely devoid of information on this project. It seems if he did not want to be reminded of a costly project failure.

In a 1958 Russian tube radio, connections are **welded** rather than using conventional tin/lead solder.

A technique never used in the USA for broadcast receivers. Easy to mount spare parts on a board like this to illustrate the technique.



Construction of RF and IF coils also strange to American eyes.

Gauze sponges and long-nose **curved** forceps get a lot of use in my clean-up of artifacts.

Forceps sold on eBay are **much** cheaper if advertised for **veterinary use**.

Non-sterile **4 ply** (not 8) cotton gauze sponges can be found at old Army/Navy or 'Prepper' stores. Or sometimes very cheap at 'Buy It Now' deals on the Web.

★ Small sponge forceps also great for holding tiny pads of steel wool.

Still ! In **DESPERATE** need for graphics documentation.

Pre-1927
(B&W image)

Also **Burgess #6**
Cell (same size)

E-mail: kd4hsh@juno.com

1924

Radio towers in graphic.
With either studs or
Fahnestock clips.

BOY ! – Would I like to get my hands on this ***National Airphone*** 1-Tuber and scan those batteries!

HERE'S WORLD'S LARGEST ONE TUBE SET

There have been many freak receivers constructed by amateurs and manufacturers, but this one tube set probably outdoes all others for size. Photo shows Miss Agnes Leonard at Radio Show, Grand Central Palace, New York City, operating the receiver. Note the size of the batteries and the tube. (Photo by International Newsreel.)

I’ve built a scanner just for #6 size dry cells.

No damage whatever to cells scanned.

Scans look terrible but they provide precise information on graphic feature placements. And very important ‘kerning’ of text characters.

What do all these digital cameras have in common?

My favorite: A **$2** workhorse.
Olympus C-7000

You don't need high megapixel images. 5 Meg. Is fine. What is most important is that they **focus sharply in close-up mode.**

These cost me less than **$10** each at the local flea market. Most needed a new battery or memory card; so maybe another $15 to $20 to make up a perfectly serviceable camera outfit for documenting your restoration and repair work.

Use one and use it often!

You have an artifact you have chosen to acquire and maybe restore or conserve.

WHY ?

Here is an excellent display to tell that story **for an exhibition.**

The problem? The parts of this display are **not likely** to stay with the artifact after the exhibition has ended.

For the **long run**, take the time to assemble your documentation into a **standard size notebook.**

It is **much more likely** to be kept close to the artifact in its usual location. (The documentation likely **will not** stay nearby if left in a loose file folder.)

Things I want to know when viewing an object.

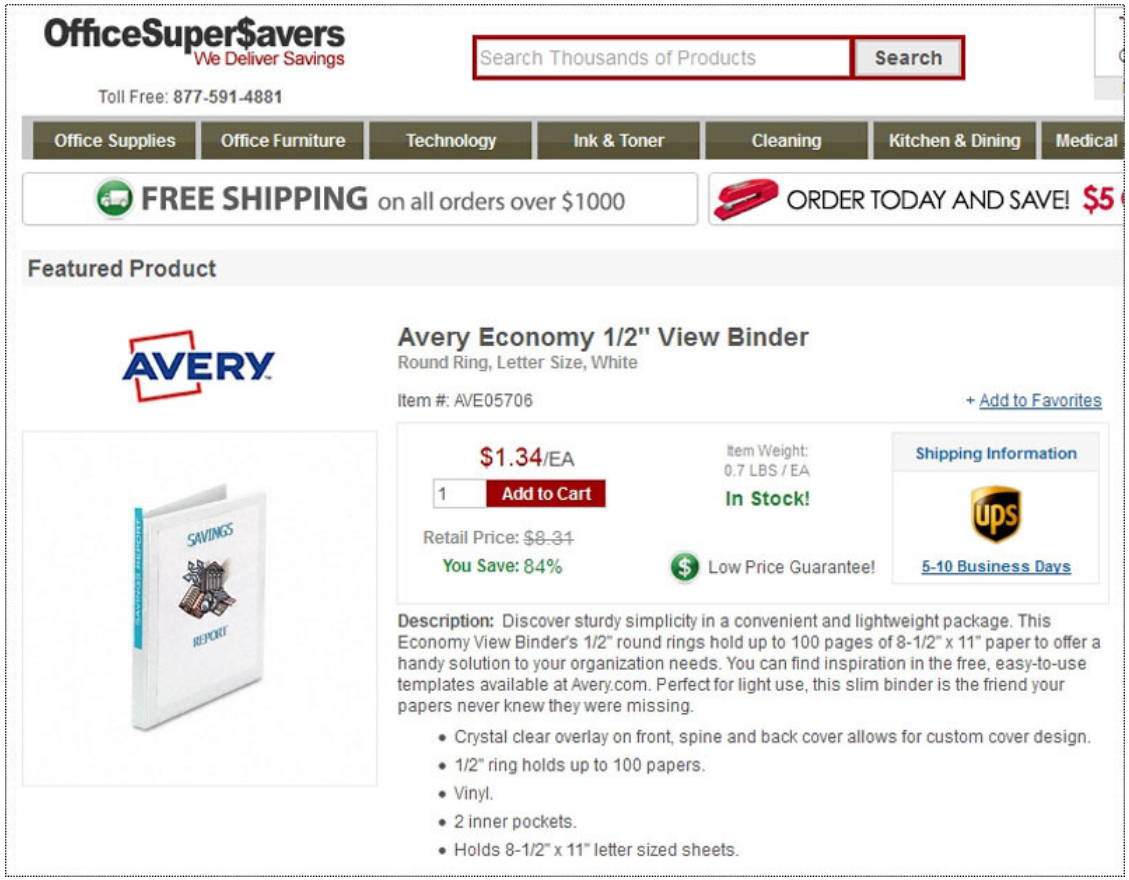
Some are often mentioned but others that I rarely see explained.

1. What is it and what does it do?
2. Who made it, when was it made and where was it made?
3. A brief background of the person or business that made the artifact.
4. How was it received in the marketplace? i.e. A successful product, niche product, one-of-many of its kind, unique or a failure?
5. Did it infringe on patents or avoid patent infringement in novel ways?
6. Were parts made in-house?
7. Is the artifact associated with interesting personalities or events?
8. What was the social, technical and marketplace environment at the time that might have prompted an entity to create such an artifact?
9. How was the artifact advertised to potential customers?
10. How did the artifact enter the marketplace? i.e Through distributor networks, direct sales, etc.?
11. Show me vintage supporting documents, schematics, drawings, and **photographs of important things inside that I cannot see**.

Order notebooks in bulk for a <u>much better price</u>.

Choose the **<u>0.5 Inch</u>** binder ring which can hold as many as 100 punched pages or about 30 pages in protective polyester sleeves.

Clear pockets on front and back allow insert of cover page.



Begin with “hooks”. One or two stand-up placards that will store in sleeves in your notebook.

The reality in any exhibition is that you have only a very few seconds to tell a viewer why your artifact is worth their attention.

Without very brief statements in large easy-to-read text you may never get the viewer to stop and read deeper into your documentation.

Adding a **border** with decorative corners to **ONLY ONE** placard is a visual clue to the **starting point** of your presentation.

Adding a light color background **to only one placard** like this can also help to make it stand out.

Examples of: A Dull, Better & Best "Read Me First" card for your display.

From the 1950s the *'Spark'* 53

A little broadcast receiver for a VERY different social environment.

USSR, rural electrification lagged that of the USA by more than 25 years creating a significant need for battery powered radios into the 1970s.

Unreliable production and distribution of batteries gave rise to a solution never employed in the West; that of a thermoelectric generator powered by a kerosene lamp.

The wiring of this radio is <u>welded</u> rather than soldered. Why? Some detective work was necessary to find the answer.

And this radio also tells us a little about 'cable radio' employed extensively in the USSR at the time.

A little radio for a VERY different social environment.

From the 1950s the 'Spark' 53

USSR, rural electrification lagged that of the USA by more than 25 years cre-ating a significant need for battery powered radios into the 1970s.

Unreliable production and distribution of batteries gave rise to a optional solution never employed in the West, that of a thermoelectric generator powered by a kerosene lamp.

The wiring of this radio is <u>welded</u> rather than soldered. Why? Detective work was necessary to find the answer.

And this radio also tells us a little about 'cable radio' employed extensively in the USSR at the time.

A little radio for a VERY different social environment.

From the 1950s the 'Spark' 53

USSR, rural electrification lagged that of the USA by more than 25 years creating a significant need for battery powered radios into the 1970s.

Unreliable production and distribution of batteries gave rise to a optional solution never employed in the West, that of a thermoelectric generator powered by a kerosene lamp.

The wiring of this radio is <u>welded</u> rather than soldered. Why? Detective work was necessary to find the answer.

And this radio also tells us a little about 'cable radio' employed extensively in the USSR at the time.

A little radio for a VERY different social environment.

From the 1950s the 'Spark' 53

USSR, rural electrification lagged that of the USA by more than 25 years creating a significant need for battery powered radios into the 1970s.

Unreliable production and distribution of batteries gave rise to a optional solution never employed in the West, that of a thermoelectric generator powered by a kerosene lamp.

The wiring of this radio is <u>welded</u> rather than soldered. Why? Detective work was necessary to find the answer.

And this radio also tells us a little about 'cable radio' employed extensively in the USSR at the time.

Now that you have ‘hooked’ the viewer, time to present in a very concise way, your ‘talking points’.

Do it on one page using a minimum of 16 point **BOLD** text in a clear font such as **Arial**.

Set the borders of your text to about 0.7” **for all sides**.

Insert a photograph of your artifact on this page.

The whole point for this exercise is that **no vintage artifacts** (that I know of) **can tell you why they exist** and how they may have changed over the years. And for many artifacts, **the whole story may have never been documented**. What better way to increase the value to and interest of future owners than by providing information **only you may have discovered**.

Make a cover page.

Simple text.

A little bit of clip art flair can make the subject seem more like something worth checking into.

Very important is identification of the author and contact information.

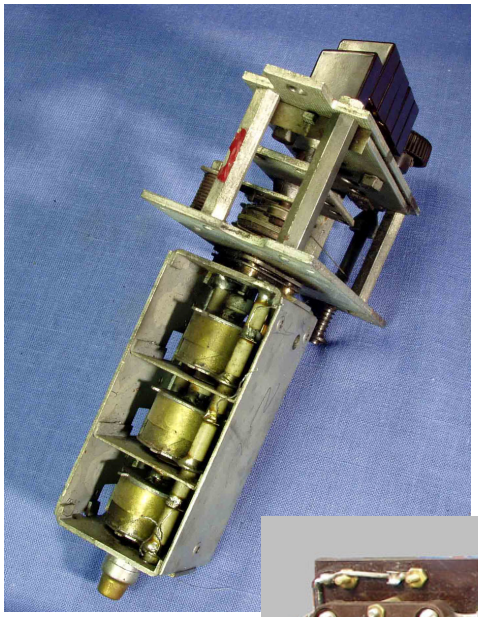
The TZGK 2-2 Thermoelectric Power Source for Broadcast Receivers of the USSR.

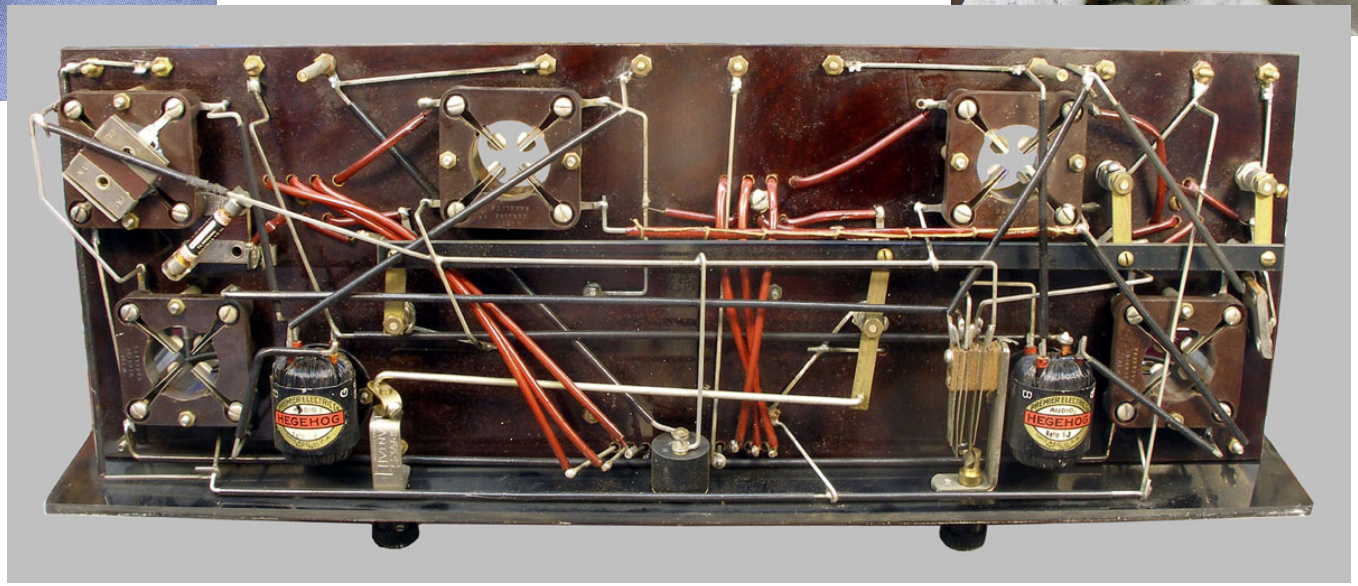
A unique 1950s solution for battery powered radios.

Its history, restoration and conservation.

From the collection of:
Robert Lozier
Monroe, NC; USA
Kd4hsh@juno.com
704-458-1076

Show interesting or distinctive features not viewable while on exhibit.





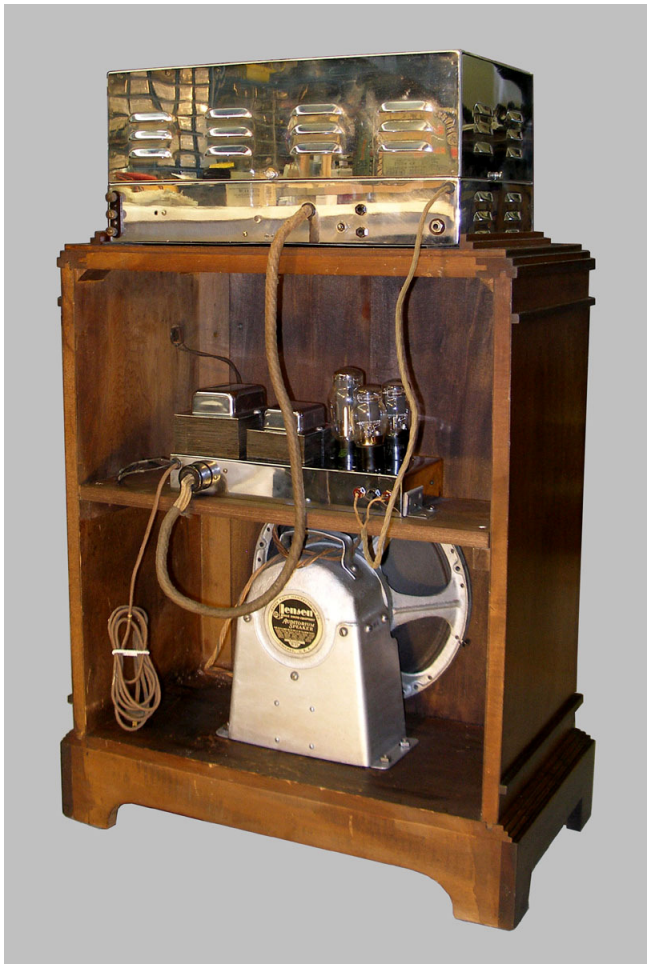
A great opportunity to show a panoramic view of a chassis on a tabloid sized (11” x 17”) fold-out. It cost me just $1.29 per sheet.

Simple photo editor tools let you make less visually confusing illustrations.

McMurdo Silver Masterpiece III

Original image on the left.

Easy to make much better with open source tools like GIMP or an old version of Photoshop.

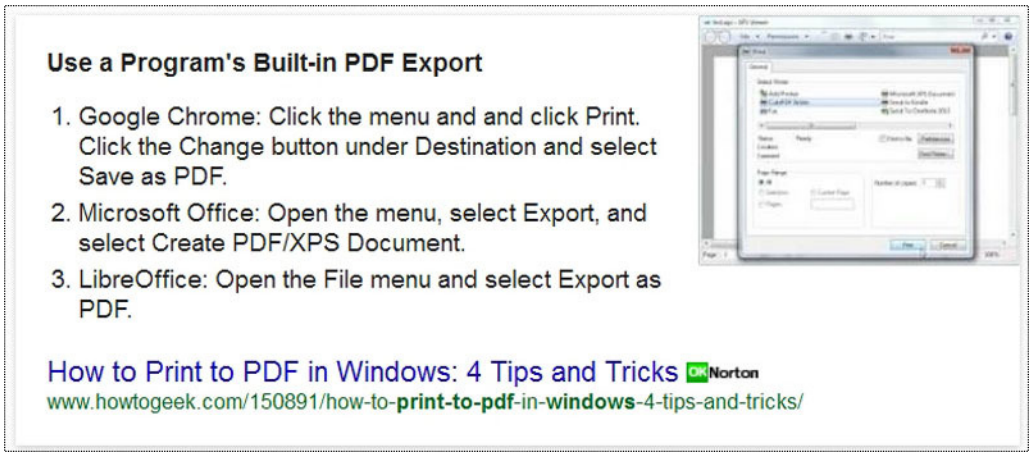


Use Lasso Tool to outline area of interest, invert selection & paint a neutral color.

Tools most used: Crop, Lasso, Clone, Magic Wand, Erase, Text & Paint.

Filters: Contrast & Brightness, Hue & Saturation, Sharpen.

It is **CHEAP** now days to get **high quality** color laser prints at your local chain office supply store in-house print shop. My local **OfficeMax** store makes letter sized prints on 24 lb. paper for $0.69. Tabloid prints for just $1.29. **These laser prints are very stable over time.**



In the setup for PDF export, set print resolution to **600 d.p.i.**

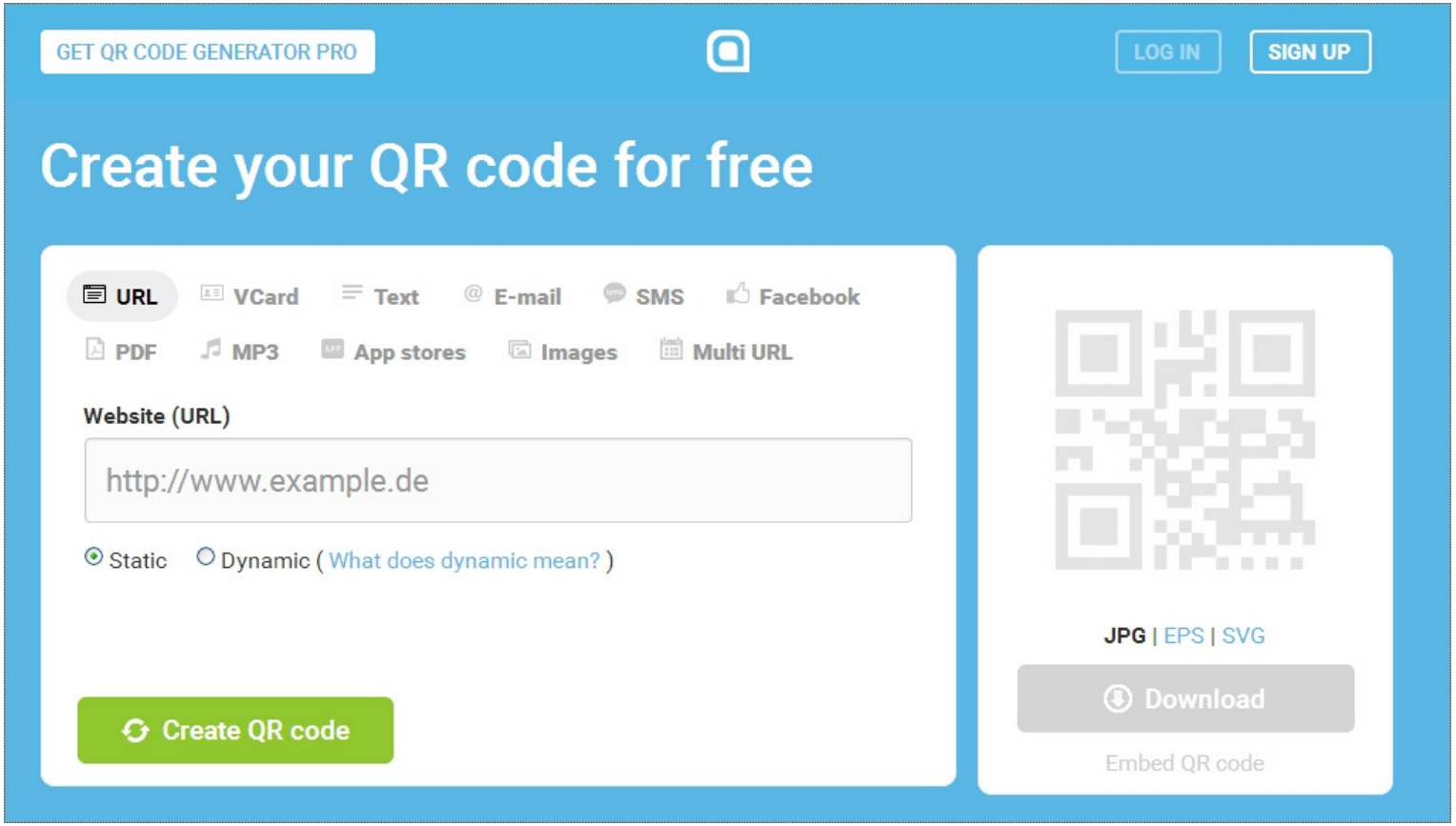
Tip: If you have a .jpg photo you want to print, **convert it to a .pdf.** For some reason, some shops can only print .jpg at 300 d.p.i. resolution.

In the 21st. Century there are even more ways to share your knowledge. Powerful ways!

Ever heard of QR Codes ?

They are compact graphics that will link your smart phone or tablet to all kinds of information. Without a subscription service they will link you to any static URL less than 180 characters long that can contain just about any type of content; text, photos, audio, video and more.

With subscription services, you can collect all kinds of statistical use data that many non-commercial sites will not care about. I certainly don't need them for my use.



Your smart phone probably has a bar / QR code reader capability. All it needs is a tiny free App available for all smart phone platforms. (Look for ad free versions.)

If you have Internet access enabled on your phone, see what happens when you recognize this one…

The previous page is a service with a monthly fee structure… There are other commercial solutions… Some allow you to create the graphic for free.

BUT !

Within **Google Docs** you can generate the QR codes **for free** if you have a free Google account. Access from any Web browser. I find it really easy to use…. Educators love this tool!

There are a number of **You-Tube** videos on the subject.

Two examples of the highest density 180 character QR code.

'factoids' for your display. Just 1.5" square; readable from at least a foot away.

No Internet connection required.

Generating QR Code tags is now even easier thanks to free on-line software from Avery Products Co. and my article and PowerPoint Tutorial free for download.

QR Code - Tag Tutorial

Below is a draft of an accompanying article (in .PDF format) on the subject. Read this before you view the PowerPoint presentation on generating tags.

New 5 July 2017 Microsoft_Word_-_Radio_artifacts_and_QR_codes-04.pdf

Below you can download a .PDF file of my draft PowerPoint Tutorial on making QR Tags to attach to vintage communications artifacts.
(This may work for anything you care to tag.)

New 2 July 2017 Microsoft_PowerPoint_-_It_is_easy_to_make_provenance_tags-00.pdf

Below are the sample files you can use to test drive this process after viewing the PowerPoint tutorial.

Spreadsheet containing the information you will encode on the tags. Format_for_QR-batch_2.xls

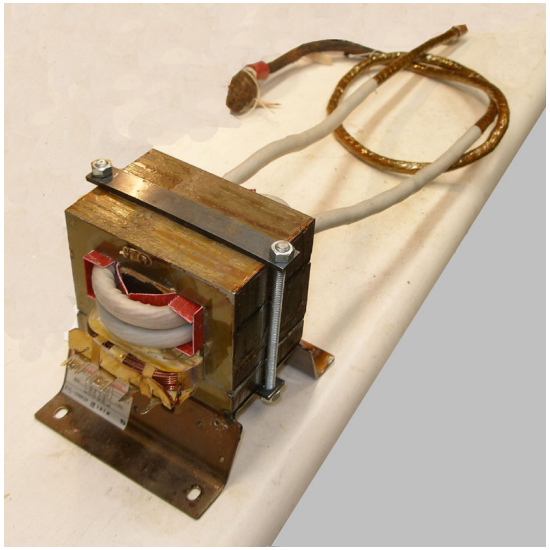
Sample Avery file used in this tutorial. REL-1-AWA-5523-03.avery

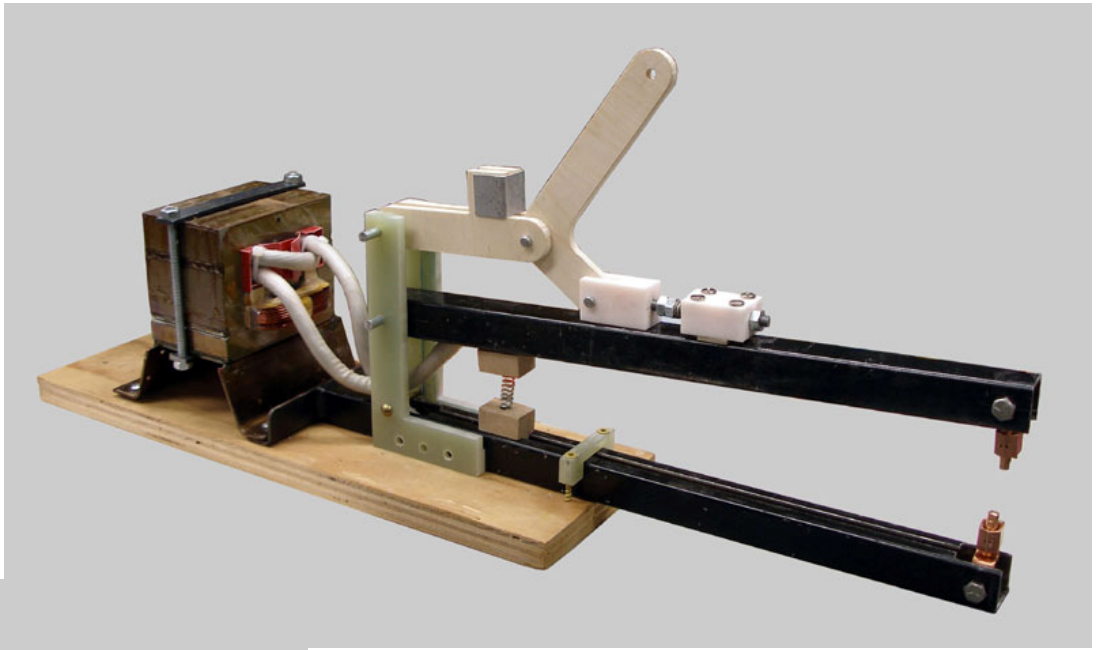
Sample sheet of tags generated with this tutorial. REL-1-AWA-5523-01.pdf

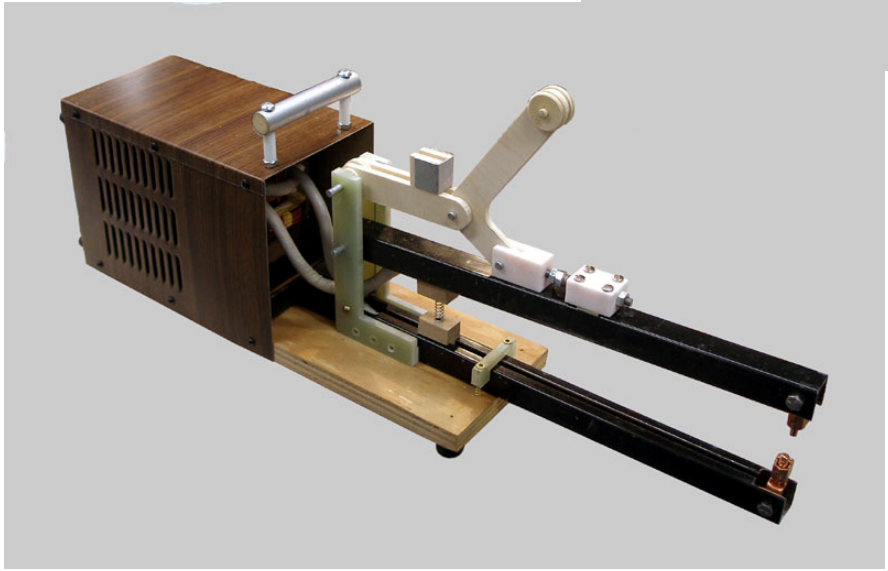
Comments welcome at: kd4hsh@carolina.rr.com

http://kd4hsh.homestead.com/qr-tags-tutorial.html

Make a resistance welder.







Transformer from old microwave.

Secondary: 00 gauge welder wire.

Spring-loaded clamp feature.

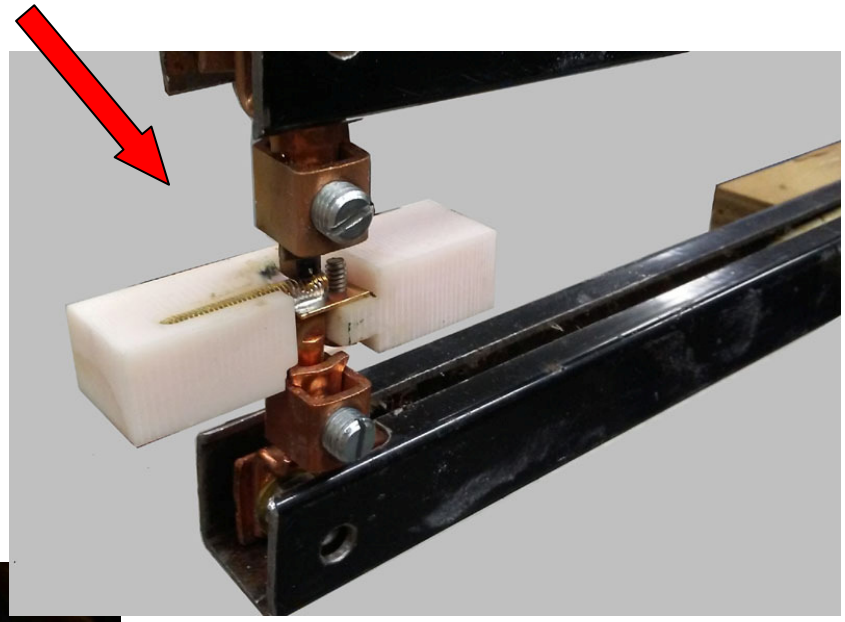
A $9 40 Amp Triac brick, 1 Ohm resistor & foot switch for control.

Cover fabricated from part of the scrapped microwave oven cabinet.

The right tool to make identical parts quickly.

Fixture holds parts in near perfect alignment.

Brass and copper parts are not spot welded because they have low resistivity. But current can be high enough to quickly reach soldering temperatures. This setup reaches full temp for silver bearing solder in 2 seconds while drawing 15 Amps from 120 VAC.



In just one second it is cool enough to release the clamp.

In short, for this task it is a 1800 Watt soldering iron!

OK, this is just nuts but it helps to prove that few things are just impossible.

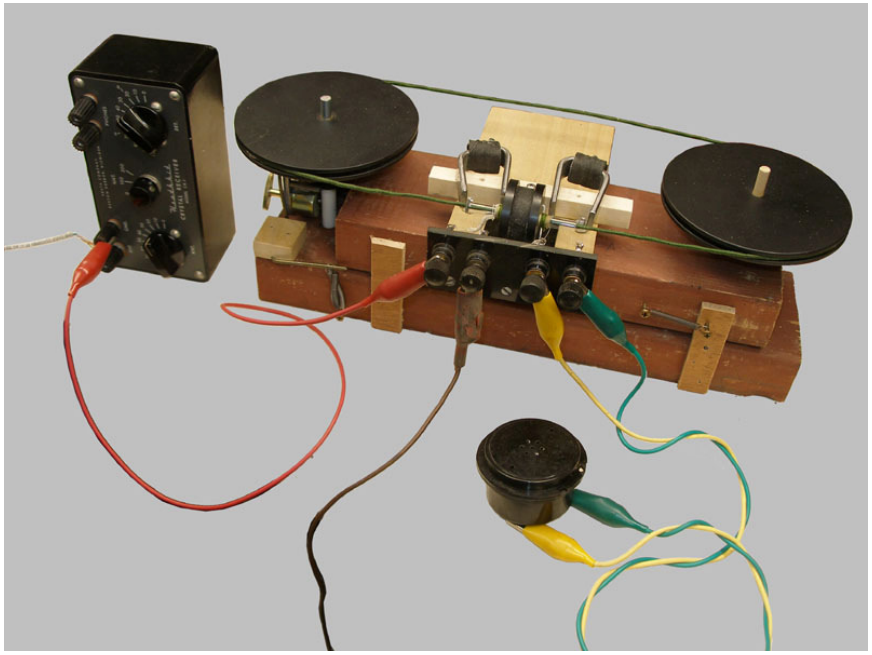
Task: I wanted to build a Marconi Magnetic Detector for experiments.

I need <u>insulated</u> small gauge <u>iron wire</u>. Nobody has it as a on-the-shelf product. Special order with setup charge and minimum buy requirements, sure. **But no way I can justify that cost.**

So how to do it in your home shop?

You have to:

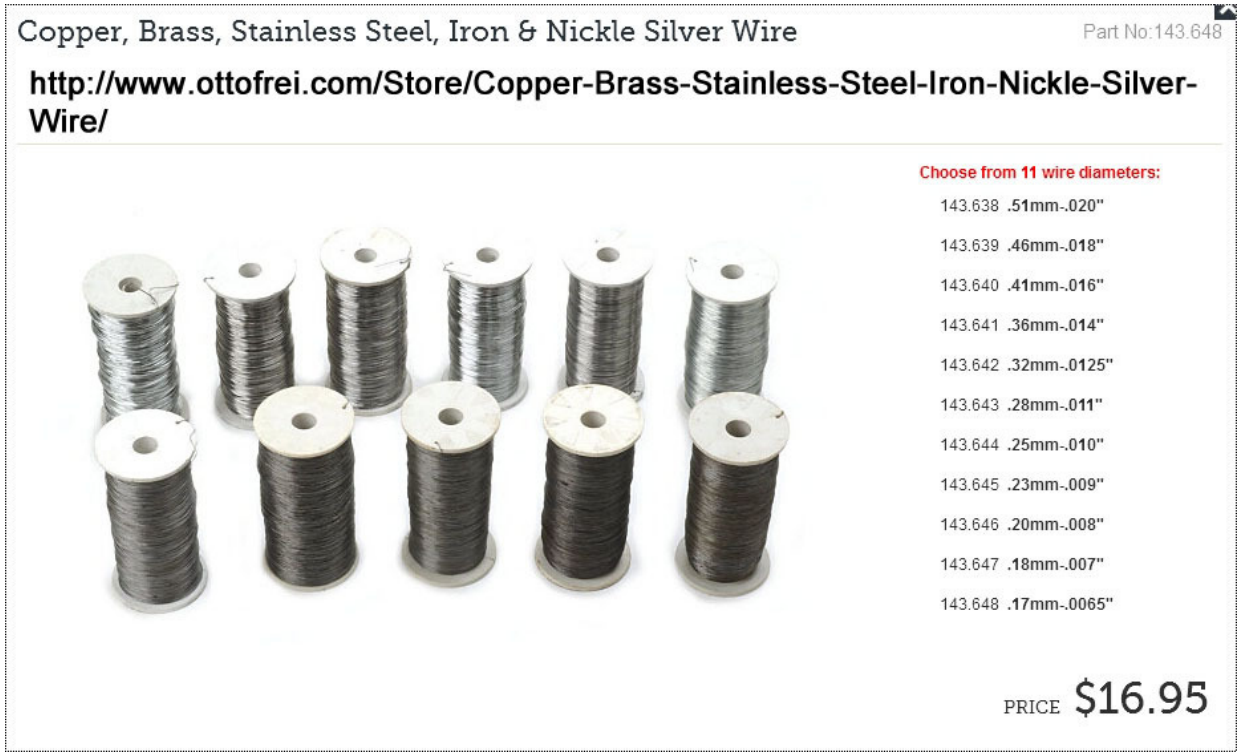
1. Find the wire.
2. Clean the wire.
3. Coat the wire.
4. Dry the coating.
5. Coat it again.
6. Dry the coating…. **Again.**



HOW ?

Find the wire:

Straightforward Google searches for iron wire get me nowhere. A 1998 book by Jensen tells of his projects to build functional replicas of Marconi equipment. He mentions use of fine iron wire by florist. A search there links to iron wire used in jewelry crafting. Finally! To jewelry making supplies and to a US vendor of the smallest gauge available (37 AWG).

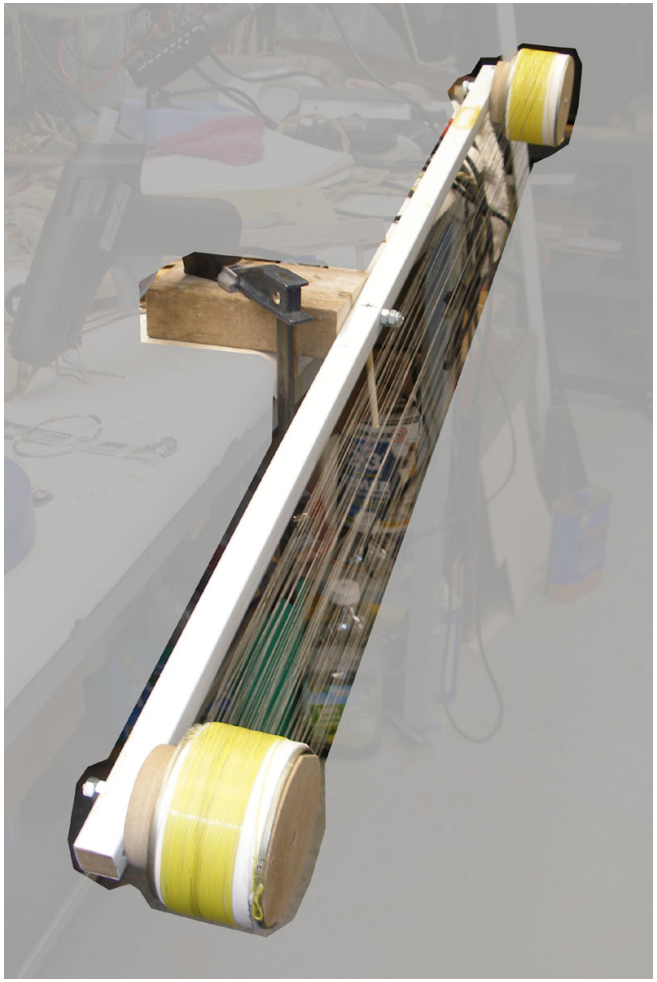


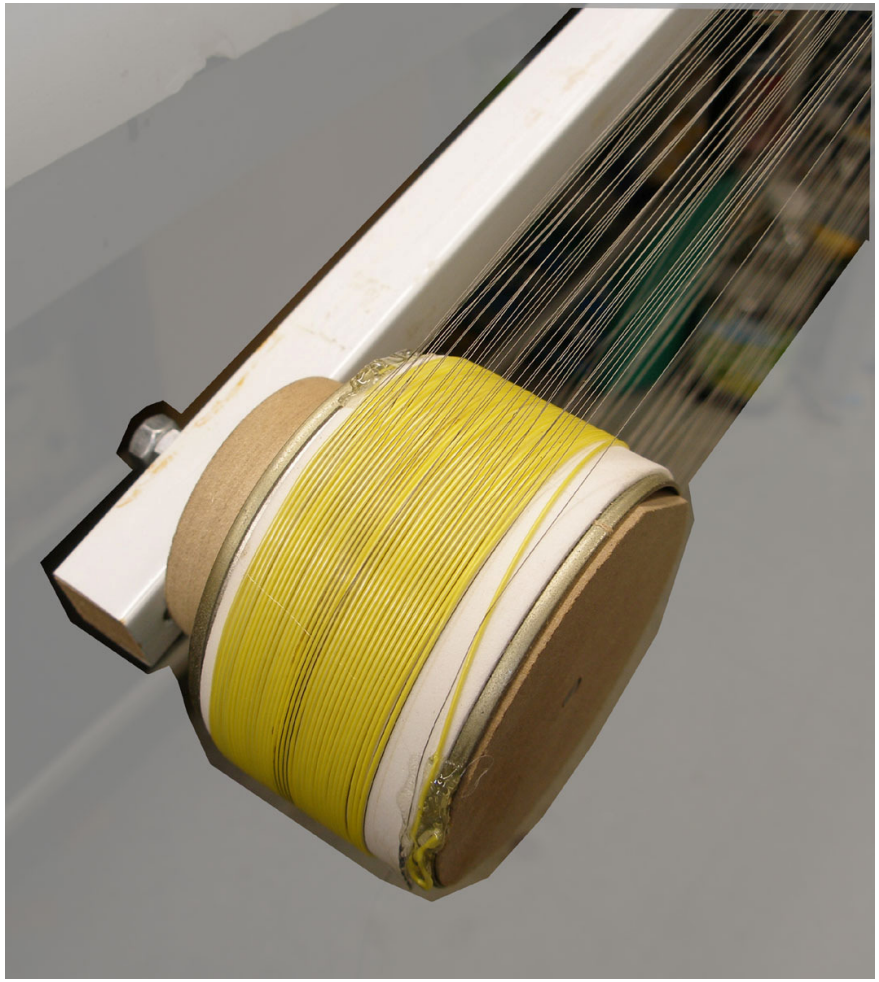
I get lucky, 37 AWG is almost identical size to the 40 SWG wire used in the original magnetic detectors. Cheap! And enough to make maybe 10 belts.

Clean the wire:

This cheap stuff comes with grease and sticky soil to remove.

Make a winder to spread the wire for cleaning.

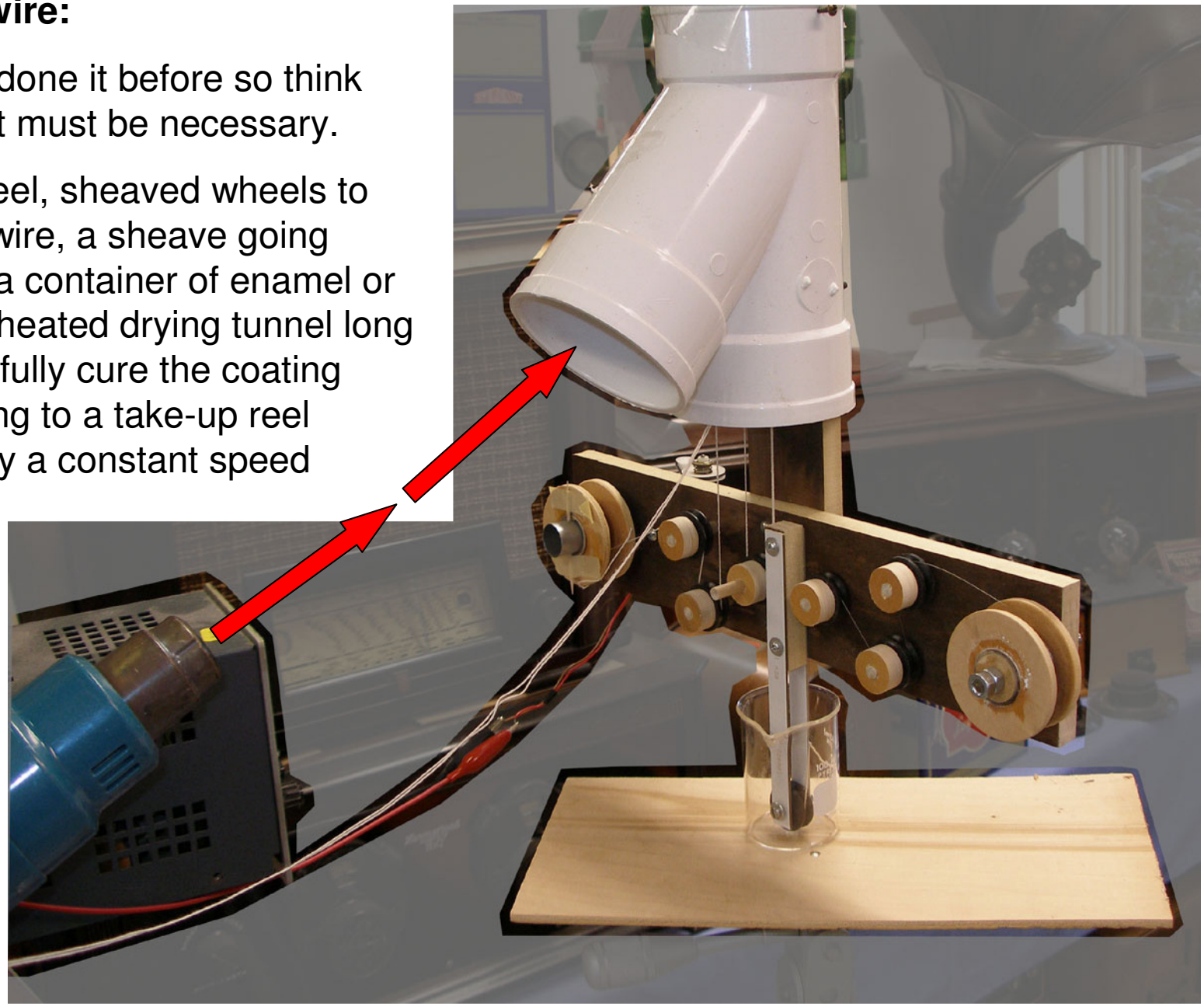




Coat the wire:

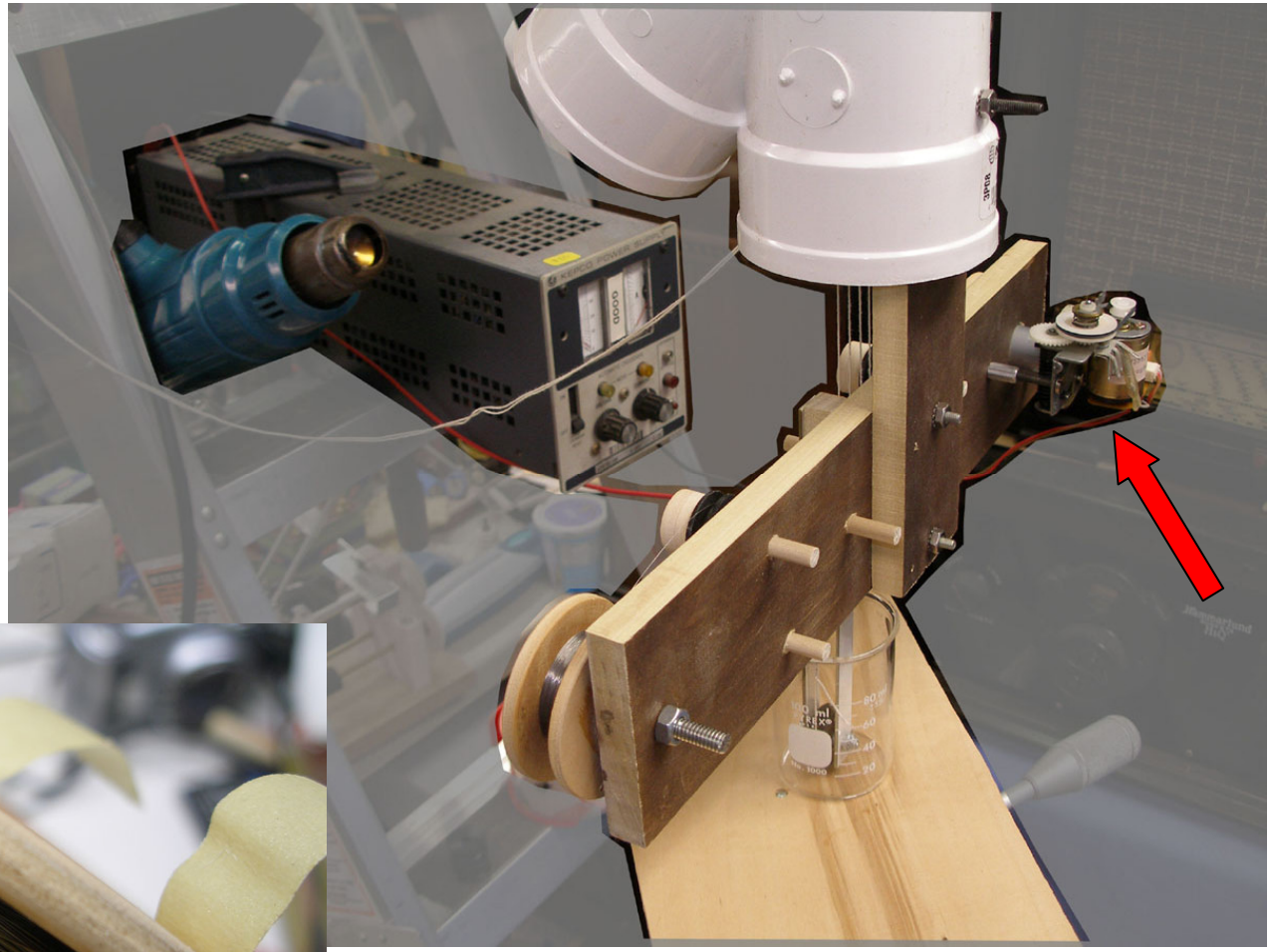
I've never done it before so think about what must be necessary.

A supply reel, sheaved wheels to guide the wire, a sheave going down into a container of enamel or varnish, a heated drying tunnel long enough to fully cure the coating before going to a take-up reel powered by a constant speed motor.



Back view showing take-up spool motor drive. Salvaged from old VHS tape player loading mechanism.

Moral: There is no junk, just misplaced resources.

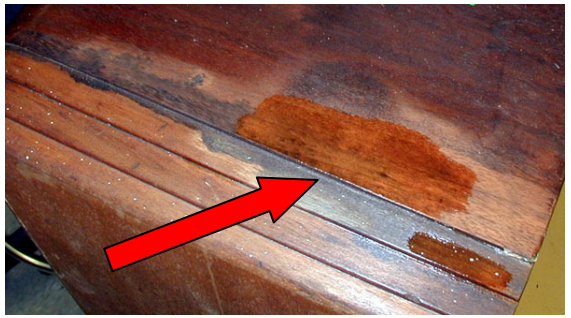


First spool of wire after making **two passes** through the coating operation. Finish looks just as smooth as stock magnet wire.

Completely satisfactory for experiments.

Motorola 6T: Iron stains on this ratty $35 flea market find.

Had not tried my hand at iron stain removal with oxalic acid in maybe 30 years. Cleaning with GoJo highlights severe stains on the top. This ought to be a great test bed; if it fails, I'm out just $35.



I'm amazed by initial results.

OK, it looks to me like it just might come out alright **IF** soaking in all that water base acid does not lift the veneers.

As a precaution in this area, I used thick blocks of MDF and heavy clamps to apply pressure while the wood dried completely for more than a day.