

Hints & Kinks 06

For electrical artifact conservation and restoration.

Prepared July – 2019

First presented at AWA Moonlight Restoration Forum - 2019



Hints-N-Kinks URL

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I intend to post an annotated version on my website.

These Hints & Kinks are all about problem solving. We all have different interests in hardware. You may never encounter the exact same challenge. But hopefully you will take away some tidbits that you can modify to suit your own needs.

Here I've limited my ideas to that of conservation and restoration and very little to repairing items so they work again.

It's a neat gizmo and I'd like to try to clean and maybe fix it.

There are so many questions you could ask yourself that would make the gizmo far more interesting to you and the people you show it to.

Here are some 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. When was it made, who made it 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? Was it 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.**



Susan Stamberg

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



Preparing Mama Stamberg's
cranberry relish.

You really should try it!

**Here is my perpetual ritual call for you to TRY the following simple
modification to your shop band saw. You will LOVE it.**

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

You really should try it!

Here is my perpetual ritual call for you to **TRY** the following simple modification to your shop band saw, You will **LOVE** it.

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.



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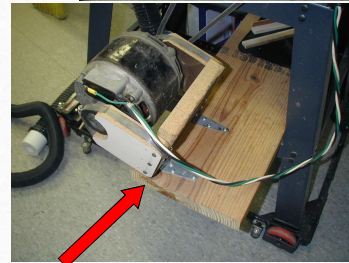
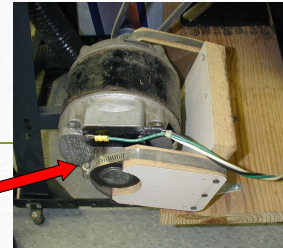


No modifications to the saw other than swapping the fan blade for a large pulley.

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

Simple strap hinges allow the motor cradle to pivot freely.

Install 14 tooth per inch bands specified for cutting non-ferrous metals.



Unplug built-in motor from its power switch.
Remove fan cover from built-in motor.
Remove fan blade.
Install large diameter pulley.

Stainless Steel heavy duty hose clamps secure the salvaged motor to the cradle.
Simple strap hinges allow the motor cradle to pivot freely.

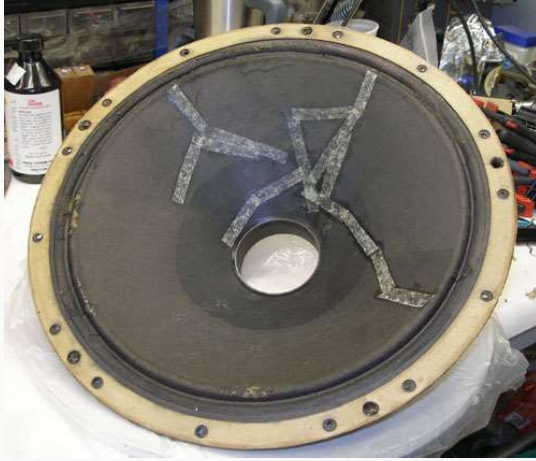
Install **14 tooth** per inch bands specified for cutting non-ferrous metals. They work great for precise cutting of wood, Bakelite, plastic, fiberglass, brass, aluminum, mild steel and Corian composites. These same band saw blades are destroyed almost immediately in these materials if run at the speeds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



**Never use Scotch tape to
fix speaker cones.**

But it is great for precisely
closing tears & punctures.

Scotch Crystal Clear or Magic Tape
work just fine. Rub it down for
best adhesion, it will be amazingly
easy to remove later.



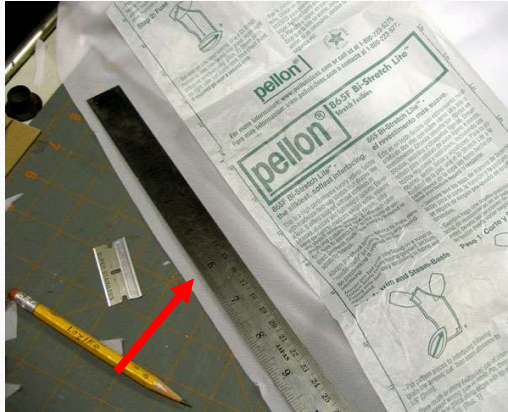
In the 'olden days' , I'd say use coffee filter paper and dilute wood glue to make your repairs.

That method is OK-ish But the paper cannot follow curves and it certainly does not work on the corrugated suspension at the speaker flange.

When you are working with trying to dilute glue, you get inconsistent results and reduced working time.

Better to get a bottle of ***Titebond II Extend*** slow set glue.

Titebond II Extend slow set glue available at most home improvement or wood workers hobby shops like Woodcrafters that has about 80 stores nation wide. There is even supposed to be one in Rochester.

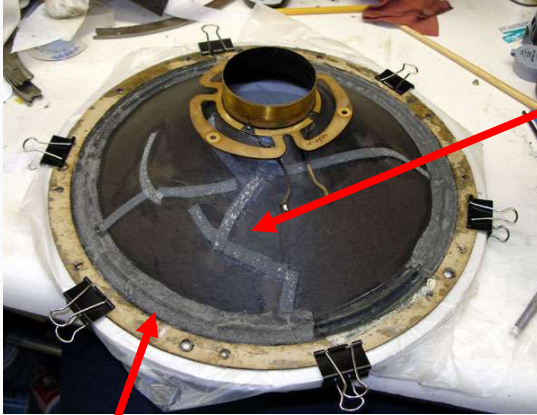


A **much better** choice than filter paper, etc. is; **Pellon #865F** Interfacing. Available at any fabric shop, and even at Walmart.

This very sheer synthetic fabric material must be cut 'on the bias' (45 degrees to the warp and weft.)

The easiest way is to place on a plastic cutting mat and slice strips using a wicked sharp razor blade as you apply firm pressure with a steel rule.

Note: There are three grades of this material. Get the **"Bi-Stretch Lite"** grade.



**This material
“drives like a dream” ...**

**Paint a thin layer of slow set glue
along your tears that you have closed
with Scotch tape on the other side.**

**Dredge your strips of Pellon through a
puddle of glue & place with tweezers.
You have plenty of time to brush out
excess glue and most air bubbles.**

**The bias-cut fabric easily conforms to curved tears and
works wonders on conforming to the cone rim corrugations.**



Works like a charm...

Remember that Scotch tape?

Now that you have glued the inside of the cone, it is time to remove the tape. Wood glue, Pelon and paper are not affected at all by lacquer thinner.

Simply saturate a camel hair brush with lacquer thinner and brush along the edges of the tape. Within a second or two you can begin to lift the tape off with tweezers.

The tape adhesive just loses its grip on the paper but does not dissolve into the cone. Any residue will ball up into a jelly you simply pick off with tweezers.

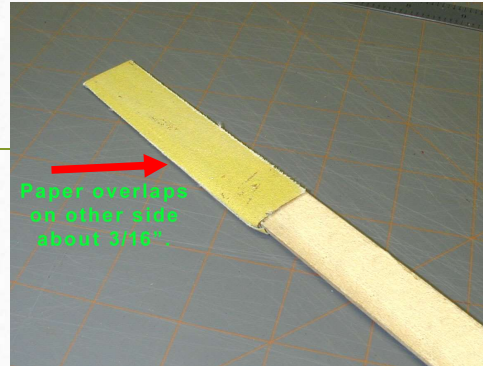
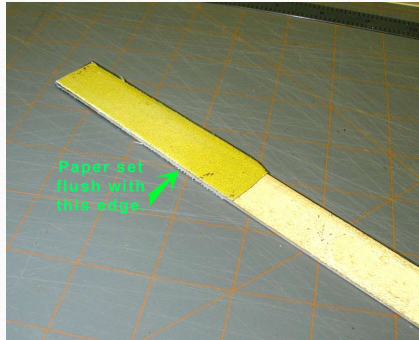
Detail Sanding Sticks



1. 1" wide strip of 220 or 80 grit sandpaper.
2. $\frac{3}{4}$ " Poplar board cut to $\frac{1}{16}$ " thick strips. i.e., **Thin enough to be flexible.**
3. 3M 77 spray adhesive sprayed on sandpaper and stick.
4. Wrap 10" length over the end of stick.
5. Clamp in vise over night to make sure paper stays absolutely flat.

Detail Sanding sticks... I use them just about every week... Cut 1" wide strips of 220 or 80 grit sandpaper into 10 inch lengths. Rip a $\frac{3}{4}$ " clear poplar board into thin strips on a table saw. The strips need to be about $\frac{1}{16}$ to $\frac{3}{32}$ inch thick... The goal is for them to be fairly flexible... Spray 3M #77 spray contact adhesive on both the stick and the paper... Wrap the strip around the end of the stick and clamp in a vise over night to make sure the paper stays absolutely flat. I wrap 8 sticks at a time then stack them for clamping.

**One edge flush with
stick, the other
overlaps about 3/16".**



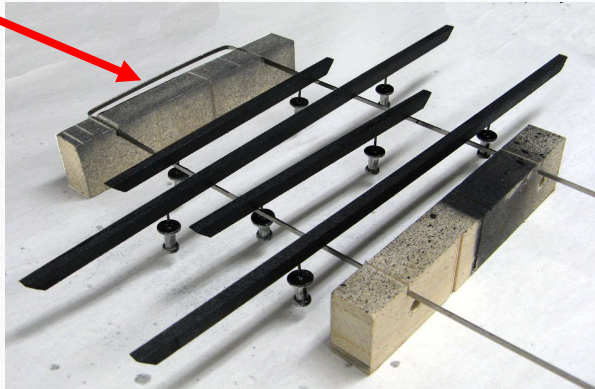
I use these about every week...

Position the strip so that it is flush on one edge and overlaps on the other side..



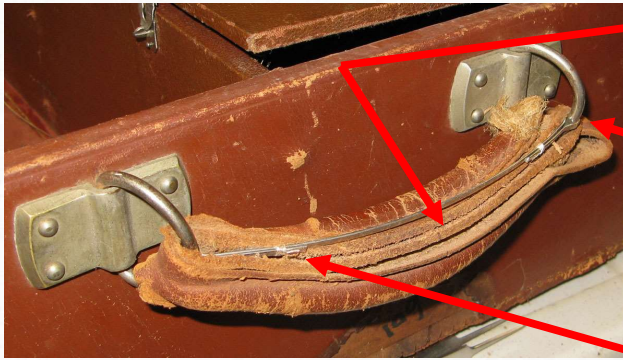
**Finally a use for old wiper blades.
--- Painting rails. ---**

Wipers have two Stainless Steel strips supporting the rubber blade. They fit perfectly in saw slots to provide sturdy parts support with very small contact area. Tacks or magnets on the parts keep them from being blown around.



It really bugs me that wiper blades cannot be recycled and that I cannot any longer get just replacement blades.

And use them to repair leather luggage handles on portable radios.



Slit stitching along one edge of handle.

Heat SS strip where you want to bend it to red heat with torch and let cool naturally.

Use a bit of fine wire to capture tails of the SS strip.

The leather may crumble to dust, but this steel strip will never fail.

And use them to repair leather luggage handles on portable radios.

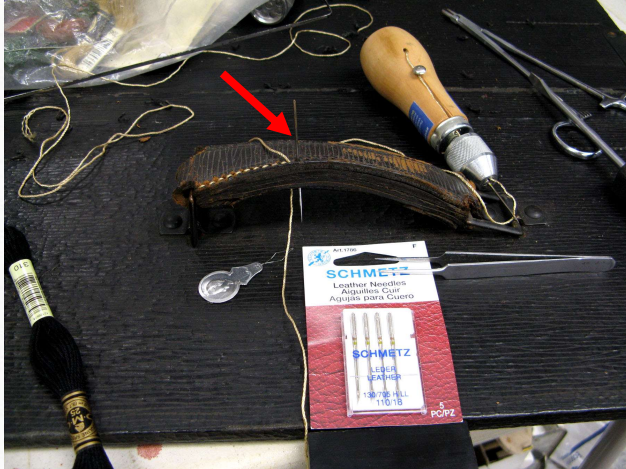
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Now you have to replace the stitching...



Sewing Awl – Comes with needles too big.

Look for sewing machine needles size 110/18 (For leather stitching.)

Stitch with nylon or embroidery floss.

Takes about an hour to stitch one side.

A \$7 sewing awl from Harbor Freight has needles far too large for our use but is otherwise OK. Fabric shops have a large sewing machine needle that is specified for leather sewing. A five pack of needles is about \$9. It matches the size needed for luggage handles. Stitch with waxed embroidery floss or nylon cord. Insert a large needle just ahead of where you are working, to find the old stitch holes and bring everything into alignment. Once you get the hang of it, I can complete this stitching in about an hour.



1920s luggage coverings are flaking & tearing. They can be reinforced.



Aleene's Fabric Fusion Permanent Fabric Adhesive dries to a flexible film but is too thick to flow into the fabric.

Dilute with two parts Toluene to one part glue.

Use micropipette to distribute on weakened fabric and brittle coating. Repeat about four times.

1920s and 30s luggage coverings used on portable radios are flaking & tearing. They can be reinforced.

Available at most craft stores, Aleene's Fabric Fusion Permanent Fabric Adhesive dries to a **flexible film** but is too thick to flow **into** the fabric.

But it is easy to dilute with two parts Toluene to one part glue.

This solution dries too fast to effectively use a brush to distribute but there is an easy alternative. Use a disposable micropipette to distribute along weakened fabric and boundaries of brittle coatings. Wait a couple of minutes and repeat up to about four times. In this case, I had the hinge unfolded so that the damaged fabric was humped-up away from whatever was below. I did not think it a good idea to have the flexing fabric bond to random points below.

If you have applied an excess of adhesive, it may appear glossy... So on your final coat, tamp the still slightly tacky surface with a dry, short bristle brush.

I have experimented with coloring the solution with black pigment designed for lacquers. It seems to work OK.

Sometimes you want it to work...
20s vintage radios with open audio transformers that is...

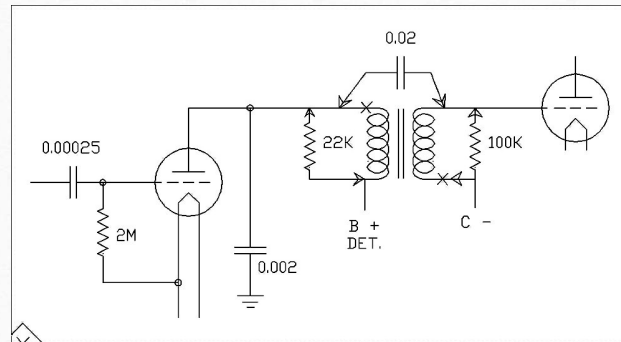


I sure don't want to see this kind of
ABOMINATION employed just to Git 'er goin'...
Is there a way to do it without replacing the original bad audios?...
In many instances, **Yes there is !**

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For decades, the easy way to make the set “work” was to substitute R-C coupling for the step-up audio transformer...

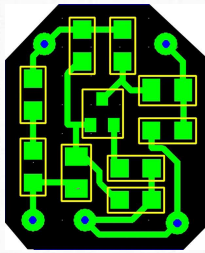
The penalty was the fact that, with R-C coupling, there is no voltage gain provided by the transformer. So amplification will definitely suffer.



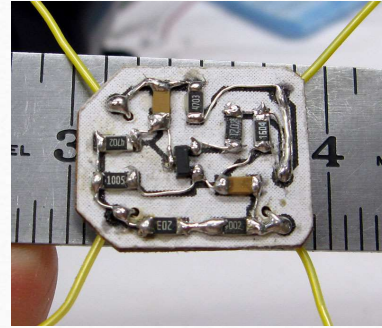
For decades, the easy way to make the set “work” was to substitute R-C coupling for the step-up audio transformer...

The penalty was the fact that, with R-C coupling, there is no voltage gain provided by the transformer. So amplification will definitely suffer.

Enter the world of Surface Mount components. High performance with miniscule size parts. The opportunity to build a functional replacement so small that it can often be completely hidden. The only necessity is to open a few circuits to the original part and tack-in new connections.



The postage stamp sized circuit board holds 10 parts costing less than \$2 and is on a circuit board costing less than \$2 in small quantity so a retail price, delivered, ought to be under \$15.



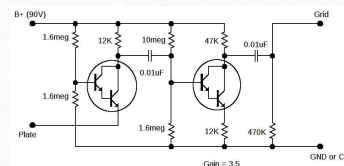
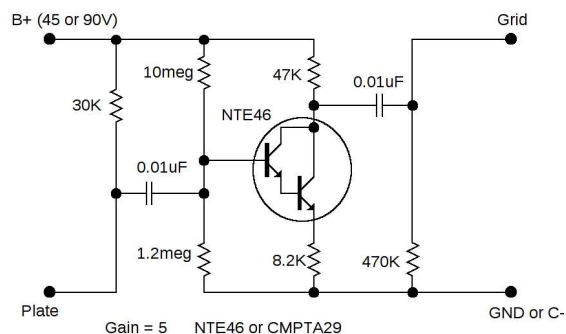
Prototype Board worked great.

Circuit by Jay Kinnard – Austin, TX, Layout by Robert Lozier – Monroe, NC

Enter the world of Surface Mount components. High performance with miniscule size parts. The opportunity to build a functional replacement so small that it can often be completely hidden. The only necessity is to open a few circuits to the original part and tack-in new connections.

The postage stamp sized circuit board holds 10 parts costing less than \$1 and is on a circuit board costing less than \$2 in small quantity so a retail price, delivered, ought to be under \$10.

This board was designed by Jay Kinnard and I did the board layout. The actual board measures 0.7 by 0.85 inches and is less than 1/10" inch thick.



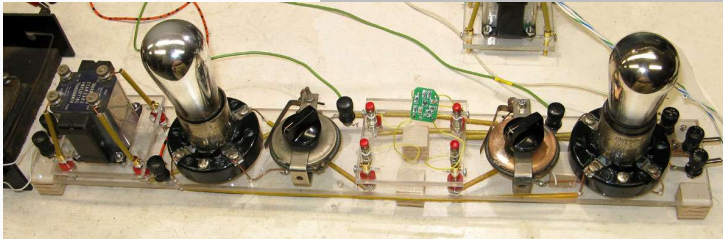
Change 1.2 Meg to 1.6 Meg & 8.2 K to 12 K and you have a gain of 3.5...

Distortion levels are in the range of 6% - Typical for mid 20s audios.

There is a "Hi-Fi" version (2% distortion) by adding another Darlington and one more resistor. But I sort-of think you are committing the **SIN of making the circuit work "**Better than new!**"**

This is the circuit. Just by changing two component values the gain can be set for 3.5 instead of 5. General distortion levels are in the range of 6% which is typical for 1920 vintage radio designs. Jay designed a "Hi-Fi" version (2% distortion) by adding another Darlington and one more resistor. But I sort-of think you are committing the **SIN** of making the circuit work "**Better than new!**" I have not laid out a circuit board for that circuit but Jay has done one that uses through-hole parts so has a larger footprint and is 3/10" thick.

**“Set Testing”
SST1D Boards.**

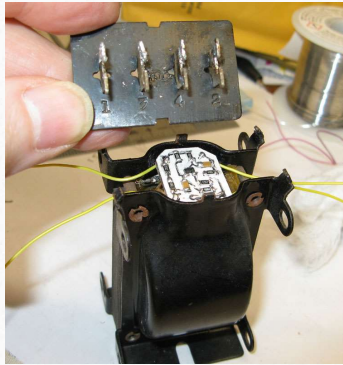


Only in direct A/B set testing will most people be able to notice the fidelity difference.

My junk boxes yielded these parts for a “Set Testing” fixture. A pair of Thoardarson audios on plug boards and a matching set of plug boards equipped with spring clips to connect the little printed circuit boards. This makes A/B comparisons easy.

This setup demonstrates that there is some variation in the way the transformer and the substitution board effect the optimum detector setting. The filament voltage on the detector I’m using here needs to be tweaked 5 or 10% to optimize the audio level. I regard this as a trivial matter. When used between the two audio tubes you can notice that the solid state circuit is pretty much linear in gain over the useful frequency range from say 50 Hz to 8 kHz. Whereas you are probably aware that the audio transformers of the 1920s definitely resulted in non-linear gain over the same frequency ranges. This only jumps out to the casual listener if you are doing A/B comparisons.

You can sometimes hide the board inside the transformer shell as in the interstage transformers used in Radiola IIIs, etc.

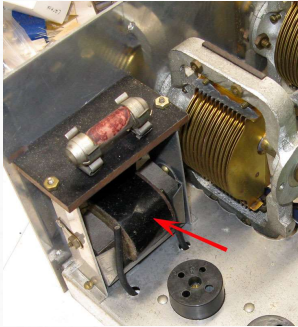


Just unsolder the transformer leads from the tag board and push down out of the way. Plenty of room to tack-in the new circuit.

You can sometimes hide the board inside a transformer shell as in this inter-stage transformer used in Radiola IIIs, etc.

Just unsolder the transformer leads from the tag board and push down out of the way. Plenty of room to tack-on the new circuit.

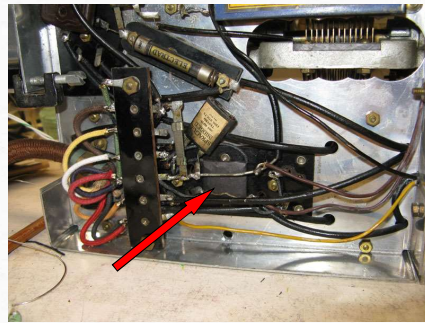
Fascinating Oriole Model 100 – Really want to analyze its performance but it has an open audio in an awkward place.



No problem!

It can stay just where it is. Simply disconnect two wires underneath.

SST1D board wrapped in black paper, with braid on lead-out wires virtually disappears!



Listening experience is practically identical to that of the original transformer.

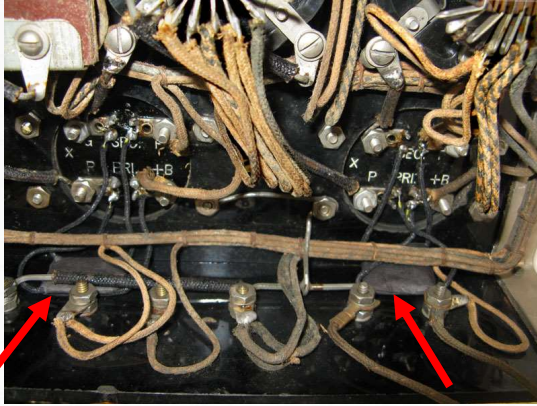
And the radio with original parts remains an accurate historical reference.

Here is the application in the fascinating Oriole Model 100. This is a radio where I really wanted to analyze the performance of the cathode follower RF amplifier circuits but it has an open audio transformer in a really awkward location.

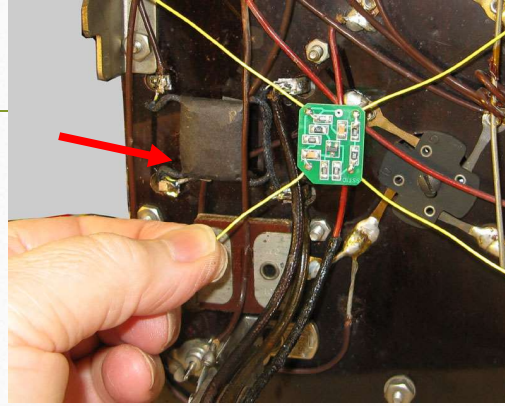
But no problem! The bad boy can stay exactly where it is and underneath the chassis two wire connections were unsoldered. The Solid State board is simply wrapped in a slip of black paper. The 24 gauge wires to the board are covered with black cotton braid available from any craft store jewelry department. It is used for stringing beads. And the connections are tacked in place. Here the board is practically hiding in plain sight.

The set performs virtually identical with a comparable transformer of the day and this radio with its original parts in place remains an accurate historical reference. My documentation of this radio identifies the use of this little subterfuge.

To date, 17 SST1D boards have been installed & reported to operate satisfactorily.



Stromberg-Carlson model 1-A



Nunn-Landon "Cascade"

More info at: <http://kd4hsh.homestead.com/sst1d-01.html>

To date I have received reports that 17 boards have been installed and operate satisfactorily although I have sold about 50 boards... Some say this is cheating. But if you don't have an original transformer working as designed, what are you going to do? Replace it with another brand of transformer? Vintage transformer or new manufacture? Won't that change the original performance somewhat? If you have someone rewind the transformer, I know of no one that rebuilds 20s vintage audios using the same winding method using single layers separated by super-thin insulating sheets. They are wound in bobbin fashion.... So the original performance is not there. And with these methods, the original parts of the radio have been replaced and are to be lost to posterity.



A simple looking task turns out to be very difficult for me. The problem, making a small bead in thin sheet metal and then bending into a small radius. No easy answers to share with you.



Just bending an offset and then carving out tabs using a 1" Dremel cut-off wheel.

Labels were easy Photoshop task.



Destroyed bypass condensers in Mercury Super Ten (1926) Even brand-new sheet metal nibblers do not cut cleanly in very thin sheet steel like this.

The seductive call of 3D Printing.

- **There are now dozens of low-cost 3D plastic filament printers from under \$200 to \$800.**
- **Filament print parts have more strength in the X-Y plane than the Z axis.**
- **Vintage parts are almost always are ejected from two-part molds with the parting line near the center of one plane. Flat bed printers work best with objects that begin with a large footprint base. This complicates making faithful replica parts with sufficient strength and surface finish to mimic the original die cast parts.**

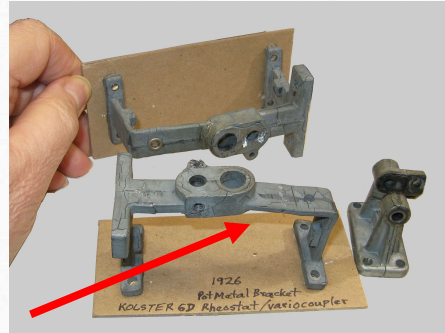
- There are other print technologies that can produce excellent replicas with the required strength and durability BUT the machines cost 10 to 100 times more.
- To amortize such costs mean that, especially, one-time parts are rapidly going to exceed the total market value of the vintage communication devices we want to restore. 😞

**BUT there are at least some applications for relatively low cost printed parts.
Here is one project I completed in 2019.**

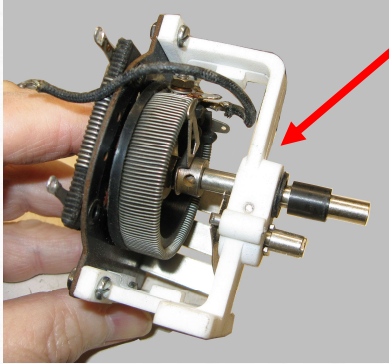
Somewhat affordable 3D Printing to the rescue for a Kolster Model 6D bought at the AWA auction in 2018.

- Set in excellent looking condition with near perfect battery cable. With a set of good tubes and sold in the auction for just \$60 because “everybody knows that they have bad pot metal”.... And “everybody” was right.

Even with broken pieces glued back together, still too warped to be of any use.

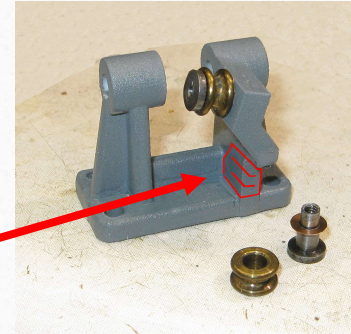


- Part judged to not be suitable for printing in lowest cost PLA filament.
- **Nylon filament** printing thought to be satisfactory but printers with that capability have real costs starting at \$1,200 to \$1,500.
- You can contract for print services. These printed brackets cost about \$50 each.



Part received from printer still needs drilling reaming, sanding and painting.

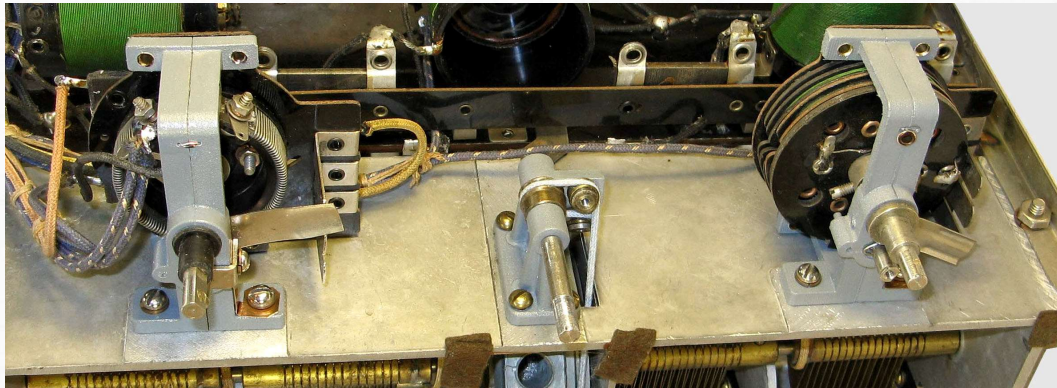
\$25 bracket after painting. Extra material necessary to limit warp.



Part judged to not be suitable for printing in lowest cost PLA filament.

Nylon filament printing thought to be satisfactory but printers with that capability have real costs starting at \$1,200 to \$1,500.

Nylon filament makes significantly stronger parts than PLA filament, but it is hydroscopic to the point that the bulk material has to be baked-out and kept hermetically sealed with desiccant until immediately before use.



Replica parts installed. Fully functional and robust enough to remain stable for many years to come. At least one mid 1920s radio using pot metal parts preserved to show how hundreds of thousands of sets were made using components that have not proved to survive for many years.

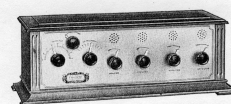
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Made by Cleartone
Radio Co. Cincinnati, OH
– Circa 1924

Could it be made
presentable?

Cleartone Goldcrest



Model 60 — \$60

Yellow brass etched panel probably
unique in American practice; this
one in sorry state. The chassis no
better. Missing clip-in RF
transformer. Paper tag on chassis
destroyed.



- Clean with GoJo and wipe down with lacquer thinner.
- Use cotton rags saturated with sodium bisulfate acid solution to remove oxidation. (The dry acid used to lower ph in swimming pools and spas.)
- Finish with fine sanding pad lubricated with mineral spirits. Carefully applied in long lateral strokes to restore grained texture.



Problem: Some excess copper evident in the pitted surface adding an unwanted pink cast to the otherwise yellow brass.

Traditional references say the way to eliminate it is by 'pickling' in strong acids. Too risky for home shop operation. (Buffing & sanding help to eliminate much of it.)

But  there is a better way !

While checking how to spell 'pickling' on the previous slide, I see the term 'pink blush on brass'. That sort-of describes the problem I had on this panel, so I click on this YouTube link.



John Ahr tells you to dissolve your sodium bisulfate not in plain water but ordinary drugstore strength (3%) hydrogen peroxide. And here is the result. 

Some of the thumb nuts mailed to me by Alan Douglas the day before he died. (RIP)

Great opportunity to see how well the use of Hydrogen Peroxide would work to clean brass and eliminate the copper "blush".

WOW !

Does it ever...



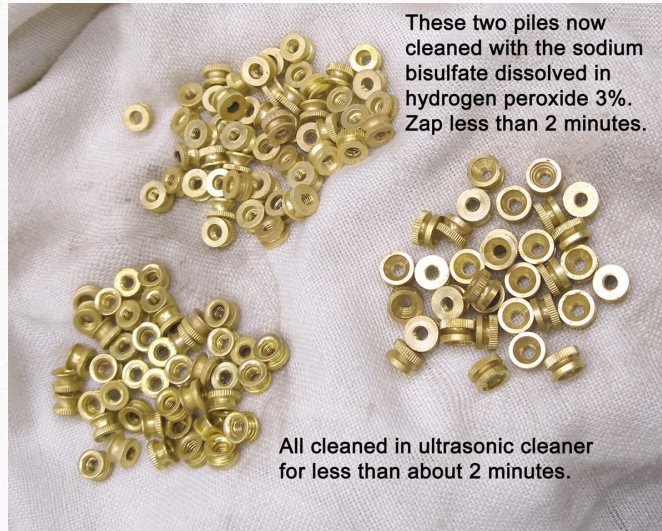
On the right, ultrasonic cleaning using soapy water and zapping for several minutes... Clean but ugly...

Top left, ultrasonic cleaning using my old standby of Sodium Bisulfate dissolved in plain water... Much cleaner...

But Wow, substitute 3% Hydrogen Peroxide solution for the plain water to dissolve the sodium bisulfate and you get super clean, blush free parts in less than two minutes of zapping.

This slide shows that the new technique will work on previously cleaned parts.

After the acid, neutralize parts by washing in water with a little baking soda followed by a thorough rinse. Always force dry parts and coat with brushing lacquer or lacquer applied with an air brush.



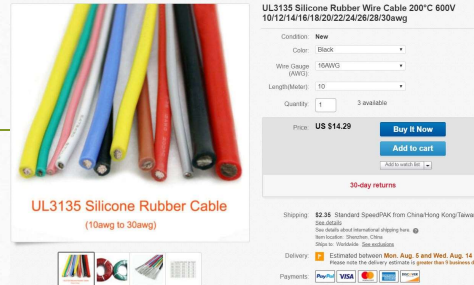
These two piles now cleaned with the sodium bisulfate dissolved in hydrogen peroxide 3%. Zap less than 2 minutes.

All cleaned in ultrasonic cleaner for less than about 2 minutes.

Cable braiding fixture to the rescue again.



This time for Mercury Super 10 battery cable with plain, black, rubber covered wire. UL-3135 wire on eBay for \$17 for a 10 meter length.



Braid covered cable has same flexibility and look of the original. Just be sure to order one-gauge larger wire in order to match the original insulation diameter.

Follow this link for article on how to build this fixture
<http://kd4hsh.homestead.com/cable-braiding.html>

Cable braiding fixture to the rescue again. This time for Mercury Super 10 battery cable with plain, black, rubber covered wire. I discovered that UL-3135 silicone rubber wire that you can buy on eBay can look great as long as you buff it lightly with 400 grit emery paper to remove the printing. That is an easy task. It cost me only \$17 for a 10 meter length. The braided cable has the same look AND flexibility of the original. Just be sure to order one-gauge larger wire in order to match the original insulation diameter. Follow this link for and article on how to build this fixture.



Make strong repairs to thin parts with Ultra Thin Fiberglass cloth made as laminate stock for printed circuit boards. Only 0.003" to 0.006" thick.

Dirt cheap on e-Bay.



Saturate with thin CA adhesive & apply cure accelerant.



Have a sheet of Mylar (PET) film handy when working with CA glues.



Immediately place a sheet of Mylar over your CA saturated fiberglass.



Now you can easily massage-out air bubbles and force the cloth to conform perfectly to the surface.



Film will easily peel off after the CA has cured. Brush on layer of thin CA to increase patch transparency even more.

Don't give up on fabric covered portables like this Motorola 8" TV.

Secret is to use a "flagged" (split end) synthetic bristle paint brush.

Wrap brush very tightly with rubber band very close to the bristle ends.

Scrub with waterless hand cleaner in small circular motions.



DO NOT USE WATER TO REMOVE EXCESS. USE ONLY TERRY CLOTH OR WADDING.

**There's GOLD! In them thar Zeniths (If it has not fallen off.)
If it has... You can fix that...**

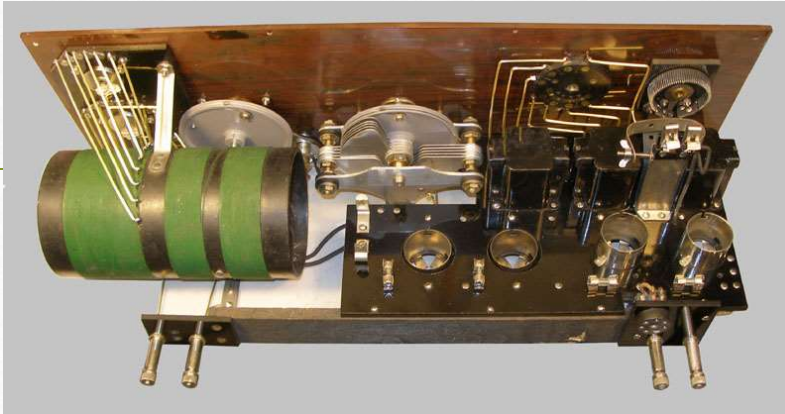


As an advertising gimmick, Zenith used gold plated copper wire.



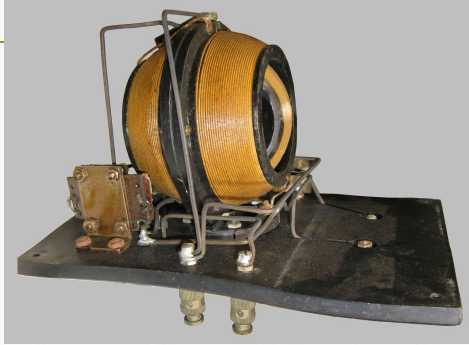
Just by accident I discovered that the jewelry making trade has #12 AWG copper wire with real gold plate.

The roll cost about \$40 delivered and is enough wire for about 1.85 Zenith 3Rs...



This chassis was in terrible condition with destroyed pot metal, dozens of cracked rivets and badly warped panel. New gold plate wire complements new replica parts and extensive refinishing.

Flatten hard rubber or molded shellac with the sun.





**Flatten hard rubber or molded shellac with the sun.
The most gentle and even way to heat such panels.**

- Cardboard box mounted to camera tripod.
- Line bottom of box with 1" Styrofoam sheet.
- Also line walls if it is below 50 F.
- Cover with thin plastic drop cloth.
- After 15 minutes or so interior should warm to about 150 F. Then wait another 15 or 20 minutes for your warped panel to relax.
- Immediately clamp panel between planks of MDF shelving and allow time for complete cooling.

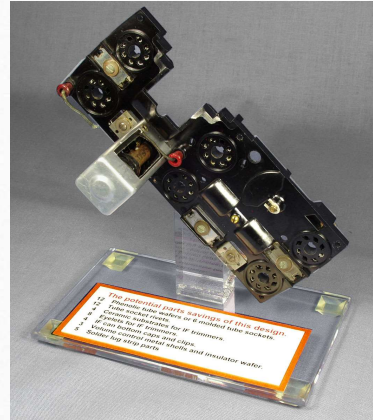


The Radiola Concert panel was so warped and so brittle that I flattened it in two stages. The first time out of the sun oven, I used spring loaded clamps that only partially flattened the panel. Another cycle in the sun oven and I felt that the panel could now be clamped with rigid clamping pliers. It worked just fine.

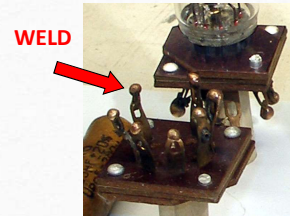
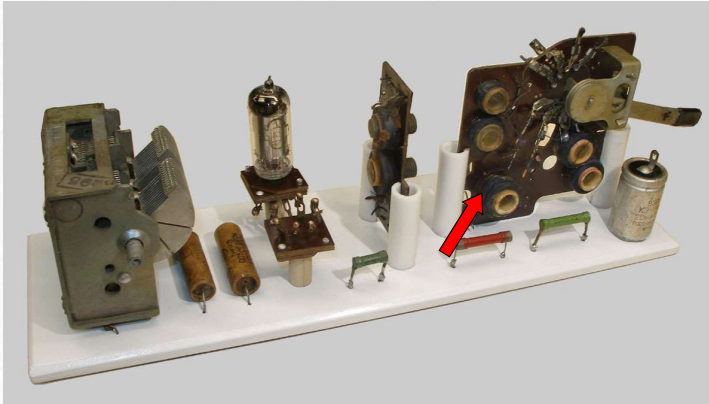
Use spare parts to illustrate interesting design features not evident from the outside.

- 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 these very expensive molds to make the part more robust.
- Production abandoned after about five months.

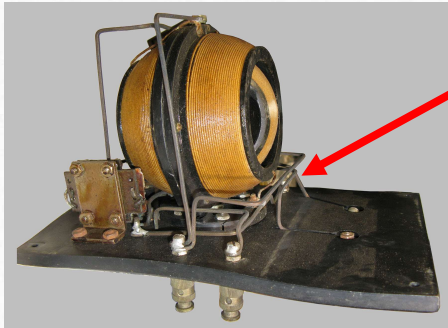
Tidbit: Zenith researchers, Bryant & Cones report that Commander McDonald's personal files appear to be completely devoid of information on this project. It seems if he did not want to be reminded of a costly project failure.



In 1958 Russian radio, connections are welded.
A technique never used in the USA for broadcast receivers.
Easy to mount spare parts on a board like this to illustrate the technique.



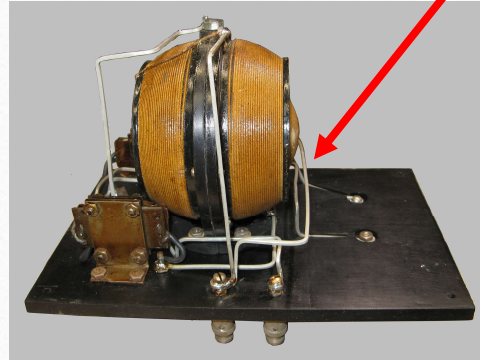
Construction of RF and IF coils also strange to American eyes.



This rare Radiola Concert crystal set has a broken variometer, badly warped panel, etc. It is going to have to be completely disassembled.

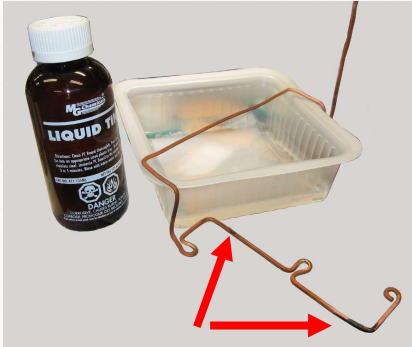
The original tin plating on the copper buss bar wiring is 98% oxidized.

It would have originally appeared like this Concert after restoration.



With all the other repairs necessary, I determined that the tin plate should be replaced so as not to contrast with all the other work performed.

Immersion tin plating to the rescue.



Although this buss wire is pretty clean, it is not good enough. Those spots of oxidized solder have got to go.

- Old buss wire must have a chemically clean surface!
- Best cleaned with OTC hydrogen peroxide (3%) and sodium bisulfite dry acid commonly used in pools and spas.
- Gentle bends can be used to flatten the wire enough for full immersion in the solution.
- When done, immediately rinse and force dry; then coat with satin clear heat resistant lacquer.

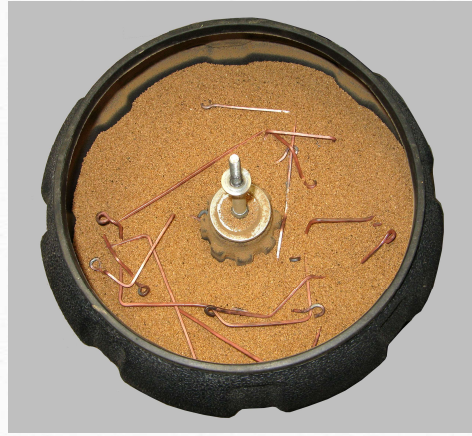
M G Chemicals Liquid Tin solution available through many distributors, eBay, etc.

Immersion tin plating takes only about 5 minutes at room temperature. The old buss wire must have a chemically clean surface, wear rubber gloves to prevent contamination and use in a well ventilated room. Best cleaned with sodium bisulfite dry acid dissolved in cheap over-the-counter 3% Hydrogen Peroxide solution as mentioned in an earlier slide. (A teaspoon of granules in about a cup of peroxide solution is strong enough.) You can put gentle bends in you buss wire to flatten it enough to have the solution cover your wire in a tray. When done, immediately rinse, force dry and straighten the wire to its original path. Then coat the wire with satin clear high heat resistant lacquer.

This buss wire needed some extra help before plating.



I don't use this cheap tumbler often but sometimes it is the best tool for the job.



Most useful abrasive media for my work is pulverized walnut shells.

This buss wire needed some extra help before plating.

I don't use this cheap tumbler often but sometimes it is the best tool for the job.

The tumbler is under \$70 and a bag of walnut shell media is under \$30. These pieces of cleaned buss wire were very dull because of the heavy oxidation. Placing in the tumbler for four plus hours had the wire looking more like it would have been at the time it was plated.

Clean fragile wire strands on a pad of Solder-Wick.



- **Wrap Solder-Wick on a wood stick to form a pad.**
- **Apply a few drops of rosin flux.**
- **Lay wire on pad.**
- **Place soldering iron tip on top of wire.**
- **Drag wire from under solder tip.**
- **After strands are separated and straightened, clean with clock makers fiberglass scratch brush.**

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Twist the strands properly and You will find that the strands will now take solder beautifully.



**Hopeless clogged spray cans...
You can recover the paint.**

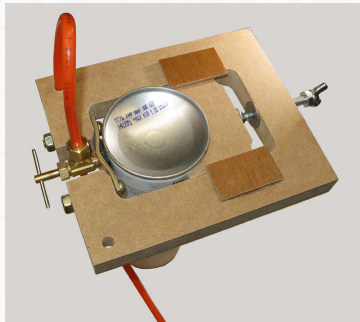
Do you have some sort of air brush outfit? It is often the preferred way to apply protective coatings and touch-up paints to our cleaned and restored vintage gear.

- Much finer control than aerosol cans.
- **Where do you get those fluids you need in small quantities?**
- Model builders on You Tube show you sloppy and dangerous ways to 'decant' paint from spray cans.
- I think I have invented a better way.



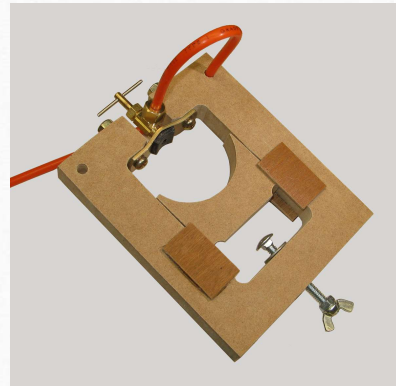


Use a Self-Piercing Saddle Valve as sold for connecting ice maker water lines in order to depressurize an aerosol spray can. With a proper tool and attention to detail, I think this can easily be done safely.



A single piece of MDF $\frac{3}{4}$ " shelving cut like this securely holds the can for controlled release of gas.

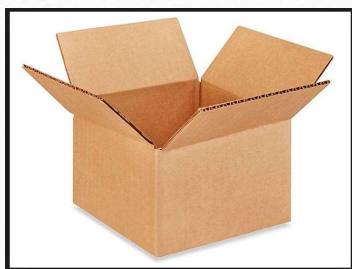
Of course work **OUTSIDE** and vent **VERY SLOWLY**.



Static pressure in aerosol cans be anywhere between 40 and 100 p.s.i. (275 to 690 kPa <kilo Pascals> That is well within the pressure rating of such a saddle valve. I cut this fixture out on my super-doooper band saw in just a few minutes. The leftover cut-out forms a saddle to give good support to the can. The $\frac{1}{4}$ -20 carriage bolt is threaded into a flat flange weld nut. A T-nut could be used IF you cut off the three barbs. (MDF would split if the T-nut tangs were driven into the cross section of this $\frac{3}{4}$ " thick board.) A full can will likely ice-up during the venting and the paint will be very cold, that means that propellant will be slow to completely leave the paint. You want to let the can return to room temperature naturally. Before attempting to decant the paint, close the valve once more and then shake the can a bit and slowly open the valve once again. You will find that additional gas is liable to vent just as you see happen when you shake a carbonated beverage.

Note that I am clamping the base of the can. I think the wall of the can is better supported for piercing that way.

Orient fixture so that valve is at highest point. Go outside and place fixture in a cardboard box. **VENT SLOWLY**, the contents will boil while the dissolved propellant escapes.



You could puncture the can wall here but I don't think the support is as good.

If you are venting a full can this way, it could take 20 minutes.



A scrap of solvent resistant soft rubber and a hose clamp will keep the contents indefinitely.

Dirt cheap disposable pipettes allow easy transfer to air brush bottles or paint pallets.





A simple tap made from two brass eyelets or a length of brass tubing with a brass washer soldered in place will give you a no-mess way to decant the contents.

You need good pump bottles for your solvents.

- Beware cheap China bottles.
- **Useless** for thin solvents.
- I can only endorse the MENDA brand.... Expensive but durable.

Menda
MENDA 35315 Amber Glass Dispensing Bottle with Stainless Steel One-Touch Pump, 4oz Capacity
★★★★☆ 50 customer reviews

Price: \$19.87
In Stock.

Specifications for this item

UFA ALCOHOL	BORIC SOLUTION	FLUX REMOVER
ETHER	ANTISEPTIC	LIQUID FLUX
ASTRINGENT	ACETONE	DI. WATER
NON-ACETONE	R.E.X.	FORMALDEHYDE
ACRYLIC LIQUID	SALINE SOLUTION	POLISH REMOVER
		STRIPPER
		THINNER
		FORNACIN

Part Number 35315
Brand Name Menda
Capacity 4 ounces
Material Glass
UNSPSC Code 41121516




- 3 bottles for Alcohol, Mineral Spirits & Lacquer Thinner.
- 3 ml poly Pipettes for transfer of stains & coatings. Less than 10 cents each.
- Artist mixing tray.

You need good pump bottles for your solvents.

And I emphasize **GOOD** pump bottles. There are many cheap China made bottles on eBay and Amazon that prove absolutely **useless** for **thin body** solvents.

I can only endorse the MENDA brand.... Expensive but durable.

My workbench has 3 bottles.... For Alcohol, Mineral Spirits & Lacquer Thinner.

I always have at hand disposable 3 ml poly Pipettes for transfer of stains and coatings; less than 10 cents each. Also essential for me are the 10 bowl artist mixing trays that cost only a couple of dollars at any crafts store.

Hints & Kinks 06

For electrical artifact conservation and restoration.

Prepared July – 2019

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Hints-N-Kinks URL

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I intend to post an annotated version on my website.

These Hints & Kinks are all about problem solving. We all have different interests in hardware. You may never encounter the exact same challenge. But hopefully you will take away some tidbits that you can modify to suit your own needs.

Here I've limited my ideas to that of conservation and restoration and very little to repairing items so they work again.