

# Building a Glass Cased mid 1920s Radio

By: Robert Lozier - ©2013

This radio was found in the early 1980s in the flea market at an Antique Wireless Association Conference in Canandaigua, NY.



A very crude cabinet missing its top hinged lid; but it had a *very* interesting assortment of circa 1925 components. I thought almost immediately that these components belonged in a plate glass cabinet.

Soon I went out and bought a small set of spade type glass drill bits and did a little reading on traditional ways of drilling glass using copper tubing and carbide grit. My trial efforts at drilling were a miserable failure so I placed this outfit on a shelf under my home workbench and there it sat until my retirement in August 2012.



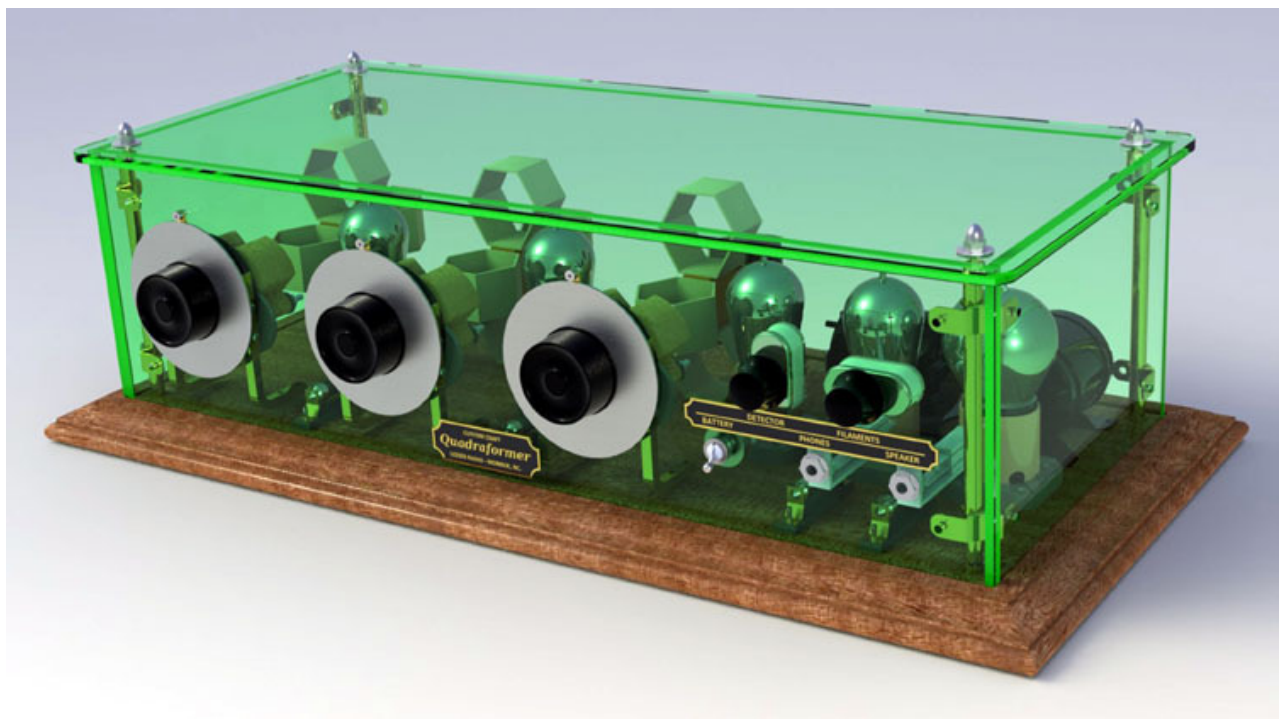
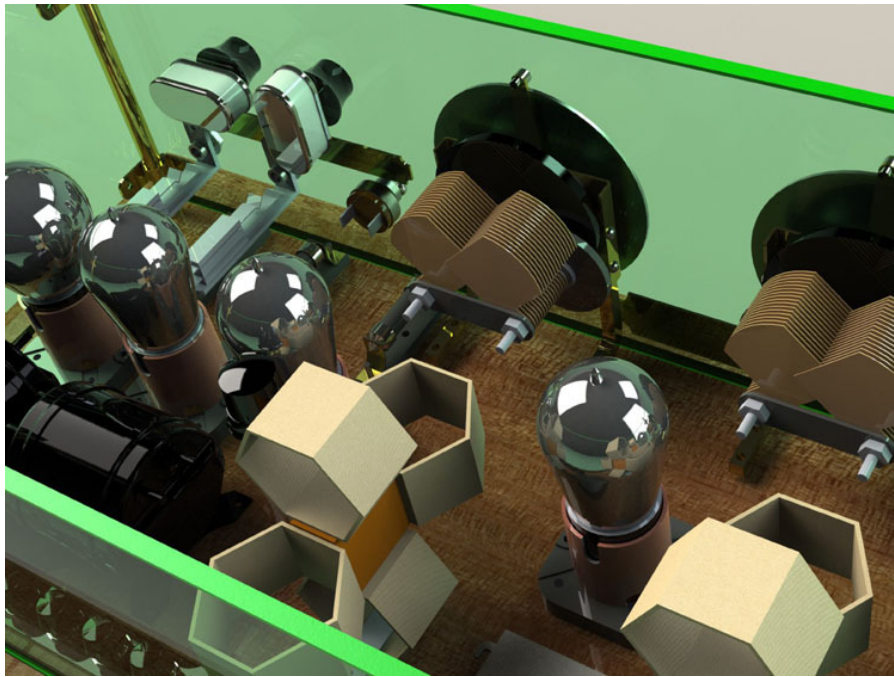
In 30+ years I gained some skills and thought I should at least try to learn how to cut and drill glass. This time researching 'how to' was easier because of the Web. I then got to work thinking about a setup that would work for my home shop. Some trial drilling showed promise.

Now I turned my attention to exactly what cabinet dimensions would make for a pleasing layout consistent with the original intent of the design.

Thanks to feedback obtained via the Antique Radio Forums at [www.antiqueradios.com](http://www.antiqueradios.com), I learned that my radio was built almost exactly

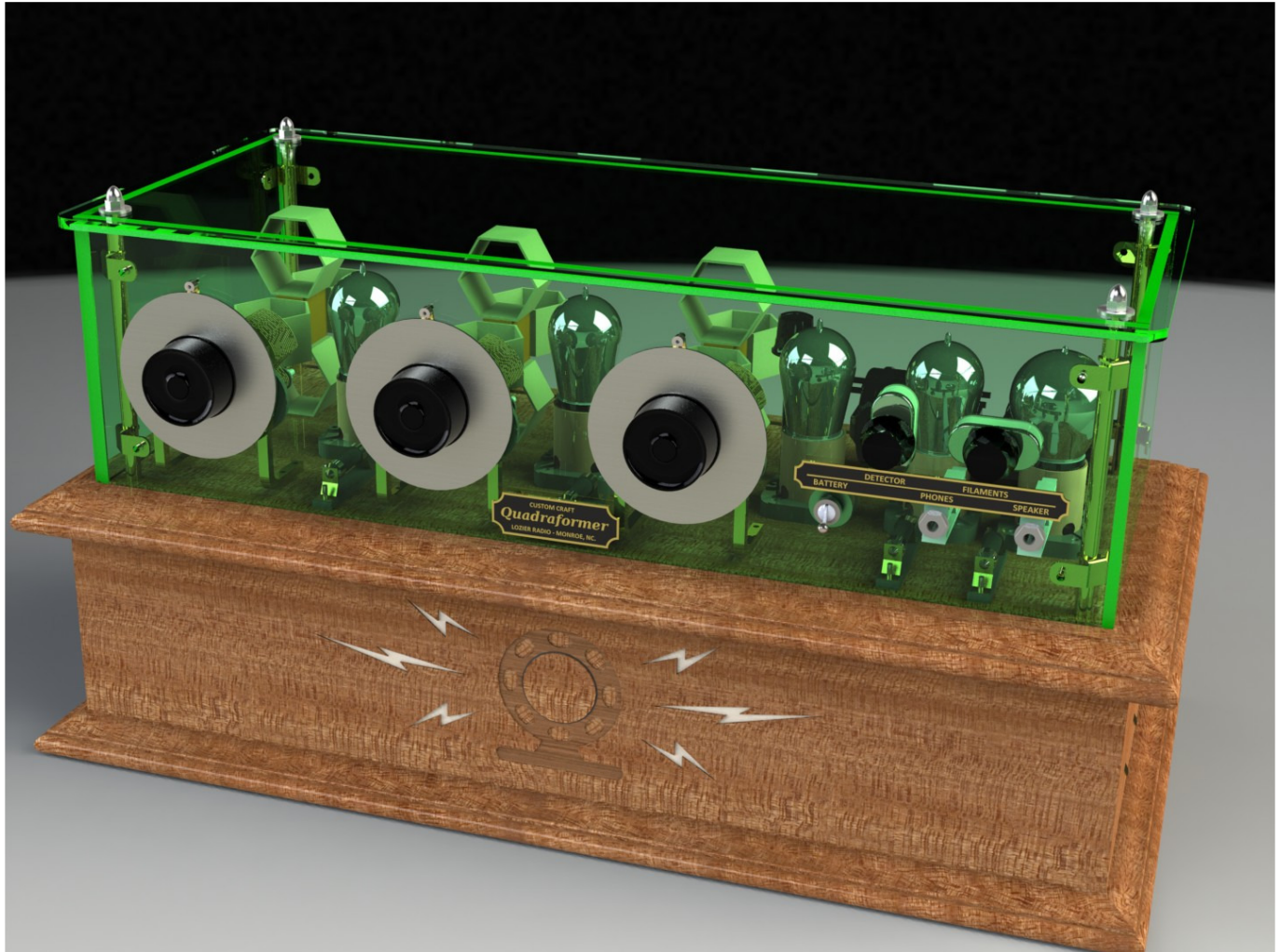
to plans appearing in the June 1925 issue of *RADIO IN THE HOME*. The radio was identified as the “New Quadraformer Receiver” and written by the inventor, E. J. Gearhart, of the Gearhart-Schlueter Radio Corporation, Fresno, California.

Here I could draw on skills gained from working with *AutoCad* and *SolidWorks* 2D and 3D modeling. Using *SolidWorks*, I modeled the major components and made trial assemblies. You can then render these models in varying degrees of detail.





After rendering the first layout, I wondered how the set might look if it had a battery box similar to what was on offer that year for the *Grebe Synchrophase*. And maybe I could try my hand at some marquetry with a period microphone motif. I thought it looked pretty cool!

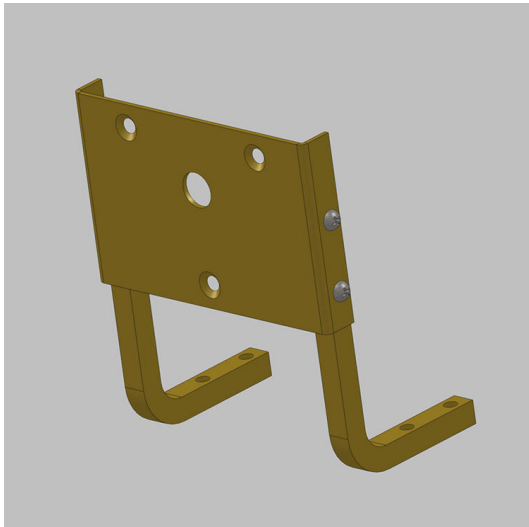


However, I considered the components in my radio. The tubes were all *Shickerling* brand UX based  $\frac{1}{4}$  Amp tubes including the very rare *Shickerling* S-700 'Power Tube'. This tube needs 135 Volts on the plate for maximum performance. That means that the radio needs 3 large 'B' batteries and a 6 Volt lead/acid storage battery. These would definitely not fit into a base with pleasing proportions in my opinion.

I had been collecting  $\frac{1}{4}$ " thick glass shelves found at flea markets and yard sales for years and had a good enough supply to take on trying to cut plate glass by myself. I cut three of the 5 panels OK but used up 6 panels in the

process... I feared I would not get two more good panels before I ran out of glass so I finally broke down and took my remaining glass to a local shop.... Zip, zip & snap perfect cuts in 10 seconds. Like magic! \$10 for the job...

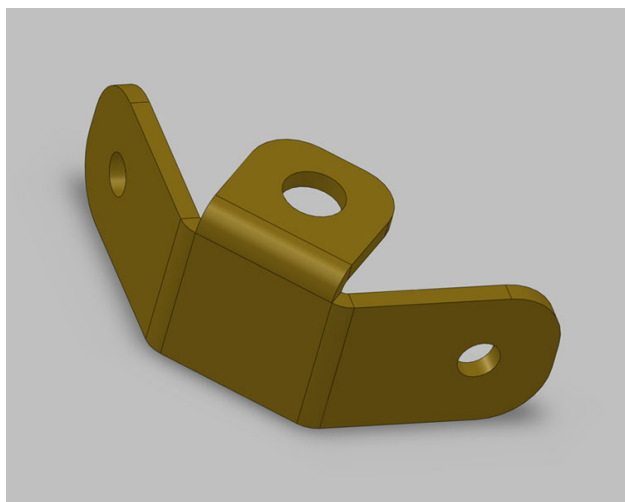
So plans were made to begin drilling for the first version shown. I decided to drill the most high risk panel first; the front panel with 15 holes.



At first I thought I would have to drill many more holes to accommodate the mounting of the *REMLER* brand tuning condensers but I figured out a mounting bracket for the units that actually supports the part from the wood base and requires only one 1/2" diameter hole for the tuning shaft.

This is the tuning condenser bracket... Aluminum sheet stock (much easier to bend in a vise than brass) and 1/4" square steel keyway stock very common for any hardware store of the day.

My design criteria said that any parts I made must have been from materials commonly available in 1925 and could be made with simple home shop tools of the day or from shop services easily available in a large town. i.e. A glass shop could provide the plate glass cut to size. A cabinet shop could make a baseboard with a modified ogee planer profile, etc.



The corner brackets to hold the sheets of plate glass are cut from the same aluminum sheet. The screws passing thru the glass into the brackets must be cushioned by electricians friction tape wrapped around the screw shafts.



**The bracket must not concentrate pressure on the hole when the screws are tightened. The cushioning is provided by washers made of commonly available ‘red rosin paper’. This was commonly used to cut out oil seal gaskets for motors and gear boxes.**

**Rather than use plain fender washers to cap the paper washers, I decided to use small rosettes. These kinds of rosettes were originally used at least from the 1700s to act as a decorative backing to small drawer pull knobs. Today they are only available for mounting mirrors in sizes too large for my project so I made the size I needed in the traditional way.**



**There was no terminal strip for power & antenna connections in the old cabinet so I made strips from Bakelite. To minimize the number of holes in the back plate glass panel, I planned to use multi conductor cables.**

**I did not have vintage cables so I made my own from tubular woven shoe laces and cloth covered wire that I dyed to various colors.**

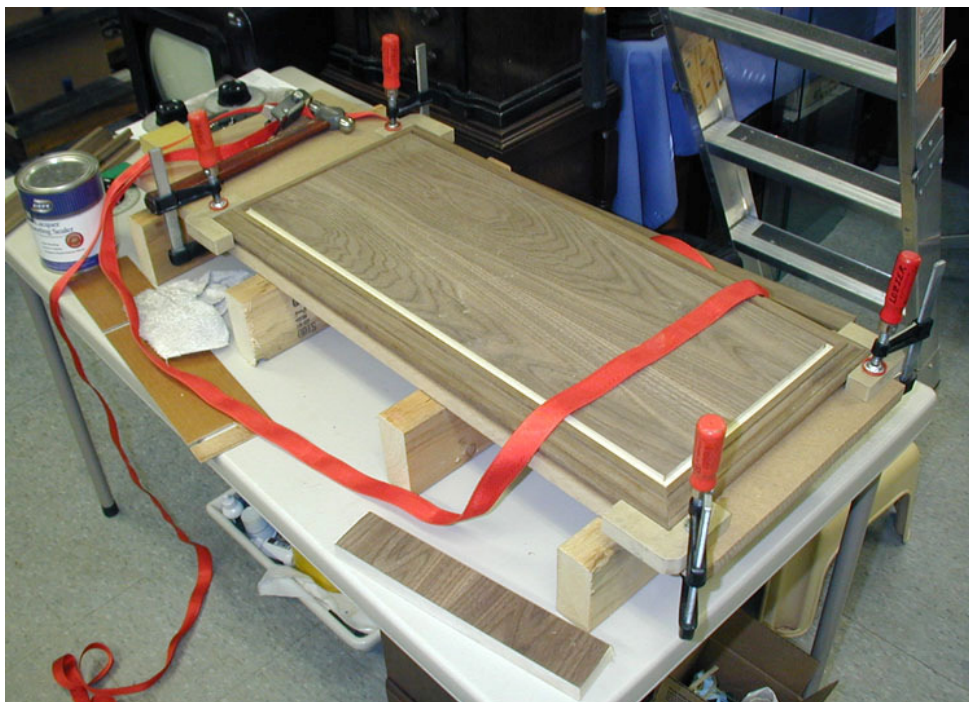


**Because of adding the terminal strip, I needed more solder lugs. I did not have any that would match the originals and the lugs available today are not close enough. Therefore I made replicas from the proper thickness sheet brass then tin plated them.**



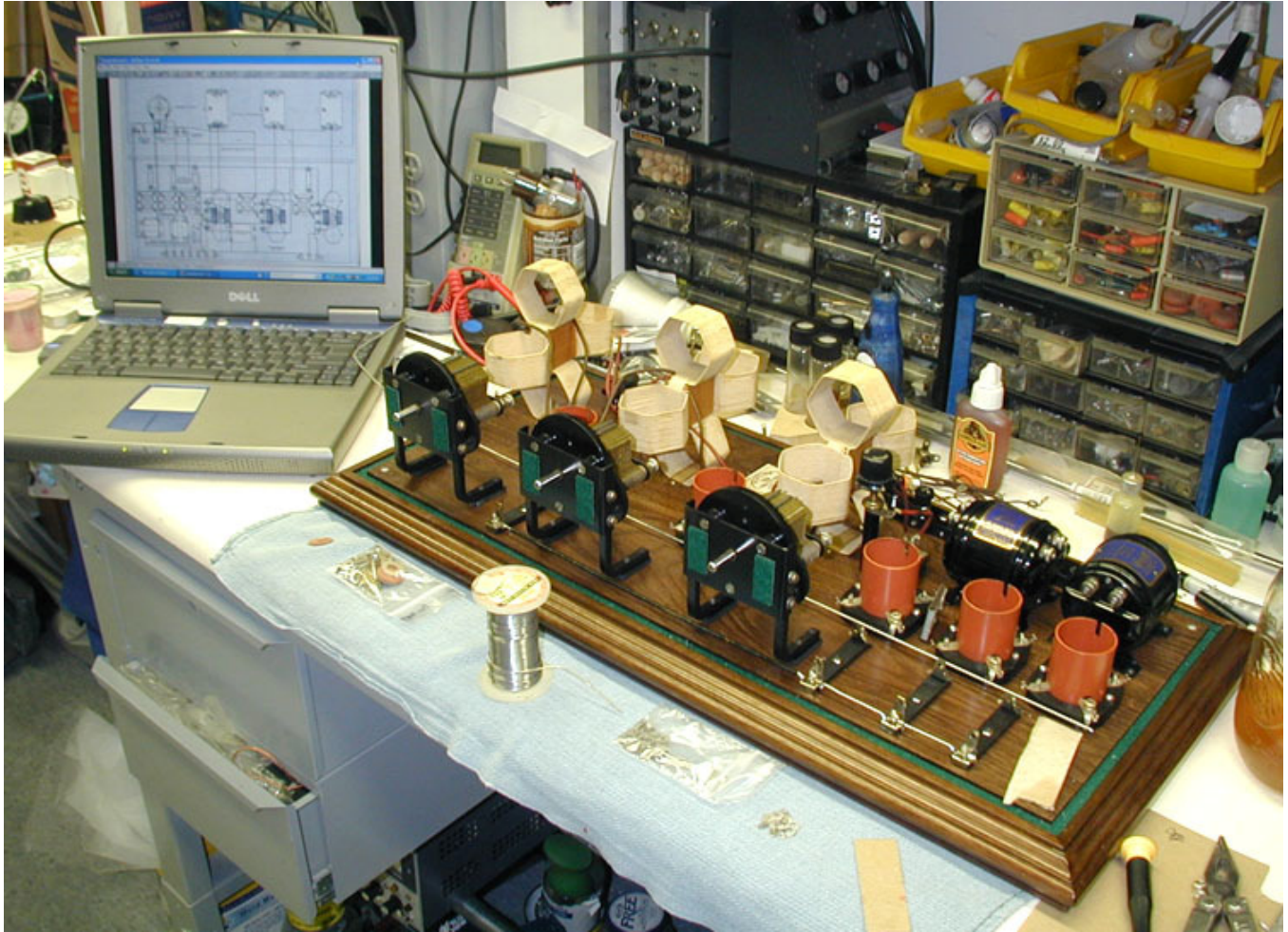
**The original wiring was done with varnished magnet wire used for motor windings. I elected to replace that wiring with round 14 AWG buss wire as in the magazine article and use varnished tubing where necessary.**

**The base of my radio is poplar with a sheet of walnut veneer glued on top. I made the edge molding from a 3"x3"x 30" piece of solid walnut that I bought at a Woodcrafters store. (\$60 !) At the local senior citizens center they have a wood shop. I was able to rip the walnut and then route the required profile. In my home shop I mitered the pieces and glued and finished the base.**





**I made the base so that I could have a groove where the glass panels could rest on a layer of green felt. This isolates the glass from stress points.**



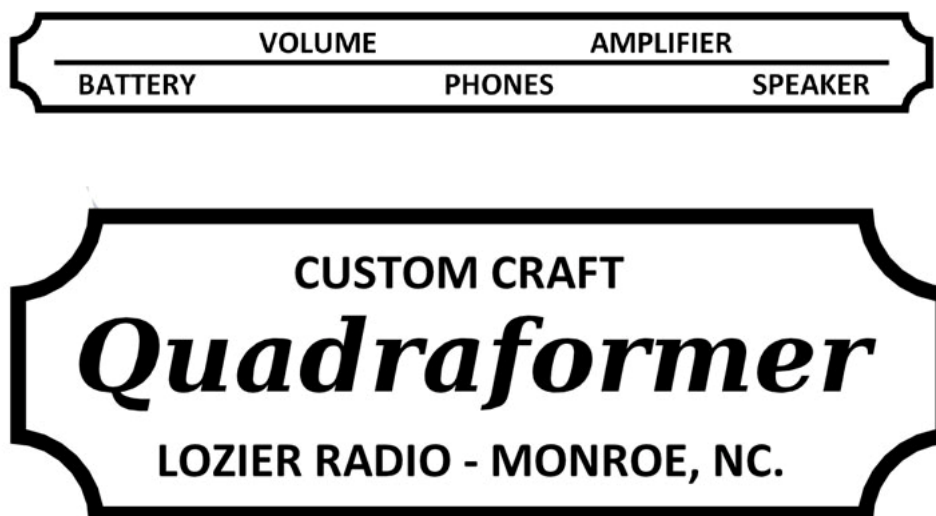
**Thanks to my 3D model, I could print out a full size pattern of mounting holes for all the components and drill pilot holes in the base knowing parts would fit correctly.**

**The only deviation from the published circuit made by the unknown original builder of this set was in the use of an additional high resistance rheostat across the secondary of the second audio transformer to provide additional volume control for the Sickerling S-700 power tube.**

**Since this design had a power tube, it could more effectively drive the Tower “Adventurer” ‘pin driver’ paper cone speaker I use in my exhibit. These were much less efficient than most of the horn speakers that were rapidly becoming dated in the eyes of the manufacturers and public.**

I have found a couple of articles in the 1925/26 time frame that made comparisons of the new paper cone speakers and the better horn speakers of the day. In general the conclusions seem to be that the new cones produced more mellow tones for background dance music but at a penalty of requiring more power to drive and loss of clarity in speech. Within 3 to 4 years, these cone speakers would be replaced by moving coil (dynamic) speakers that have been used almost exclusively ever since.

The controls were not labeled but that would not do for my recreation. This is the only glass cased radio I will probably ever make and since the original circuit builder is unknown, I thought it would be OK to 'brand' my recreation with tags like this.



Since this was to be a radio where you get to see all of the components inside, I thought it only fitting that I should work to make the viewer of this radio aware of all the things outside of the radio necessary to actually bring the human voice, music and other sounds into your home 'from out of the aether'.

Therefore when I first exhibited this radio at the 2013 Antique Radio Charlotte meet in March of this year, I also brought all the components you see in the following picture.

I draw your attention to the batteries required to operate such a radio. Batteries are devices with definitely limited lifetimes. You use them up and then discard them right away. Therefore 80+ year old batteries are



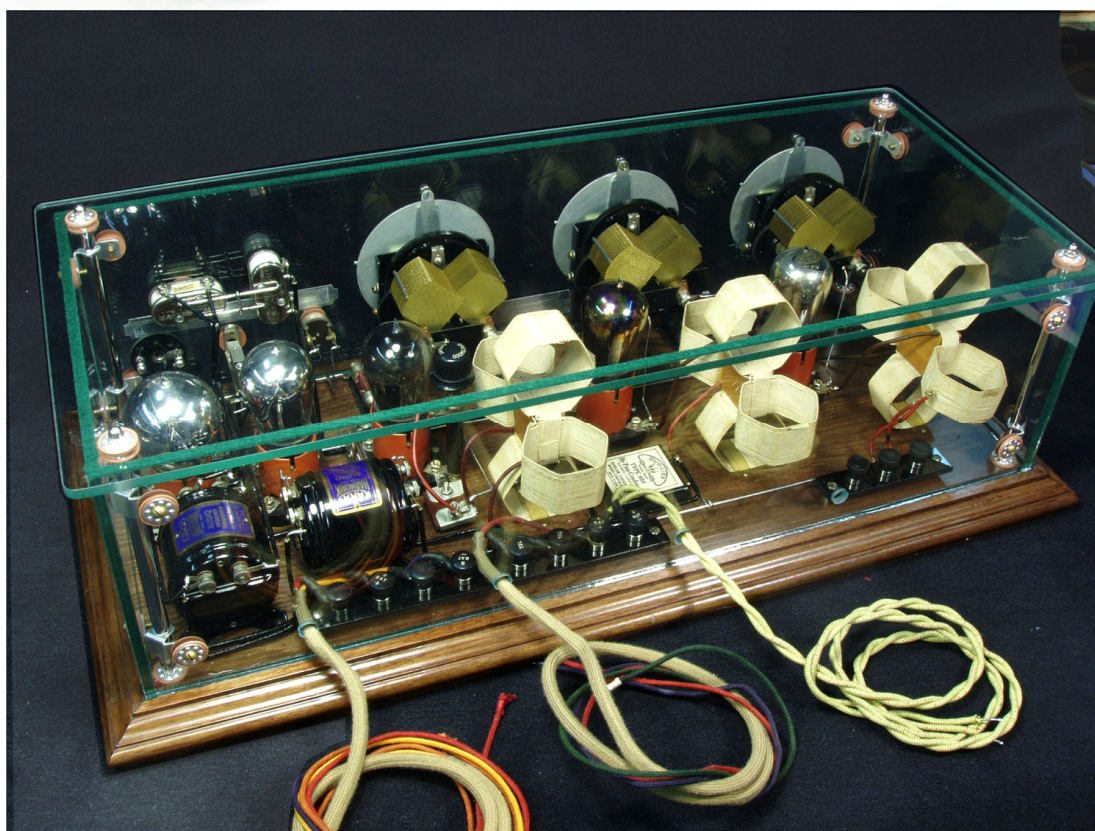
very rare today. So rare that, in my many years of collecting, I do not have three matching, circa 1925, 'B' batteries. This prompted me to take on the project of making museum grade replicas of a large *Eveready* brand 'B' battery.

The six volt Radio 'A' battery used to light the filaments of the tubes is even more rare than the same vintage 'B' batteries. This is because there was already a well established business in rebuilding and reclaiming lead from automobile batteries. These worn out Radio 'A' batteries would be taken to the local auto garage shop where you might get 50 cents to a dollar for the scrap value.



I hear that the term 'Bucket List' made popular by the 2007 film of the same name is supposed to be completely passé. But construction of a glass cased radio was certainly high on my list and I am very pleased with the results. To date I have received two Best of Shows and craftsmanship awards.





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