

The Ozarka RC-200

First version of partially assembled home broadcast receiver to be completed and then sold door-to-door by enterprising men as described in a sales program called the *Ozarka Plan*.

Early 1924



It's 2017 restoration from a 'barn fresh' wreck to what you see now.

From the collection of:

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Matheson Bell, founder of Ozarka was a consummate promoter who could have told Dale Carnegie, a thing or two. He came up with the idea to sell unwired radios to enterprising men who would wire the sets and then sell them in a franchise area door-to-door. His earliest 1924 advertisements offered a free booklet named the OZARKA Plan to explain the business model. A four page flyer found in my radio mentions that the *Ozarka Plan* book has sold out and states that you can get the 12 page booklet description of how the radio is built and set up as is included with every radio. Later advertisements say that the Ozarka Plan book is 24 pages. 1925 versions are said to have 80 pages and still later a 96 page version.

YOU, TOO
Can Easily
Make Big Money
Building and Selling Long Distance
Radio Instruments



Radio offers the biggest money-making opportunity on earth today. And the *Ozarka Plan* opens the door to this big opportunity. Look at the picture of this beautiful Radio Receiver. This picture was made from an actual photograph. By the *Ozarka Plan* that Radio Instrument can be the product of your own making—easily, simply and surely. It will be yours to make, to sell and to reap a rich reward in cash profits.

No experience necessary. You need not have much cash. All you need is spare time, determination and action. If you're that kind of a chap, the *Ozarka Plan* will start you on a straight line toward a real money-making business of your own. It can be as big and as profitable as you are ambitious to make it. We want good men in every county. Exclusive territory is going fast. Be sure and give us the name of your county. Write today for the *Ozarka Plan*. A wonderfully interesting book, of facts, particulars and proofs. It is FREE. Act now.

OZARKA, INC.
851 Washington Blvd. CHICAGO

radios to be sold under the Ozarka Plan. It was in terrible condition with restoration challenges that I was unable to address until 2017.

The earliest advertisement in Popular Mechanics appears in the February 1924 issue page 166 of the Advertising Section. In the same issue, page 143 carries an advertisement for Cunningham tubes including the C-301A shown in the advertising cut to have clear glass, tit-top bulb with brass UV base. I think that the C-301A were all gettered covering all the bulb. I think this was 'artistic license' by the advertising department. For exhibition purposes I have installed these types of tubes.

Some 30 years ago I acquired one of these first





I knew that my set was missing the battery box base because the hinges for the box were still attached to the bottom of the radio cabinet. I had no verified dimensions. The skirt of one of the (presumed) tuning knobs was 70% missing and years of searching had not produced a replacement. Some Bakelite molded wire bushings were missing. The set still had what I presume are all of the pages of the assembly instructions and I found a photograph of this radio in a June, 2010 article in

Antique Radio Classifieds. Unfortunately I have not been able to locate the author who was retired at the time of writing the article; he may have died.



His radio was assembled by a person in Arkansas, my set was assembled by "Pendleton & Dad" of Paintsville, KY. At this point I do not know if the

builder had attempted to sell this set in his home town. I am in the process of trying to find out if copies (probably on microfilm) of the Paintsville Herald exist from the 1924/25 era and might have had an article on



Pendleton's activities.

With photographs from the ARC article, photographs & measurements provided by Don Patterson of a slightly fancier factory assembled set, the assembly instructions and a photo in a 1924 Popular Mechanics

advertisement , I could determine how best to construct a replica battery box. There are inconsistencies between the photo shown in Popular Mechanics and the set shown in the 2010 ARC article. I can presume that the April 1924 photo and line drawing shown in the assembly instructions is of a prototype receiver. Notice that the front of the battery box is flush with the front of the radio cabinet. I suspect that by the time of production in quantity they had realized that this made it difficult to lift the front of the radio to gain access to the battery compartment. By insetting the front of the box as shown in the ARC photo, that problem was eliminated. Don Patterson's factory finished radio cabinet also shows this same type of inset. The cabinet uses 'locking rabbet' joints. The kerf cut-to-depth is only 3/32" wide. My radial arm saw makes a 1/8" + wide cut so I had to resort to making the cuts with a miter box. It was not fun at all to get these cuts made correctly with the miserable excuse for a "precision miter box" that Stanley sells at the home centers these days.



While the 'barn fresh' exterior of my cabinet was virtually devoid of any clues as to how the cabinet should have been finished, the inside of the top lid was still in good shape except along areas that rested on the frame of the cabinet. Although I do not know the wood species, it appears to have a red mahogany stain and top coats of a polymerizing varnish. I made my replica battery box from poplar. Trying to match the color of this new work to the old cabinet was time consuming and not entirely successful.

From a Smithsonian Web page: "Polymerizing or "reactive varnish" systems harden rather than dry. This is accomplished by the polymerization of the mono or oligomeric constituents of the formulation. In most cases the exact

chemical reaction process of the polymerization is relatively unimportant for either the creating craftsman or the conservator/restorer.” These varnish films are difficult to touch-up. Only the strongest solvents will soften the finish at all and when the finish dries out, it is likely to be cloudy.

To repair the completely lost patches of varnish along the inside-front edge of the top lid I did the following. There is a product called Constantine Pad-



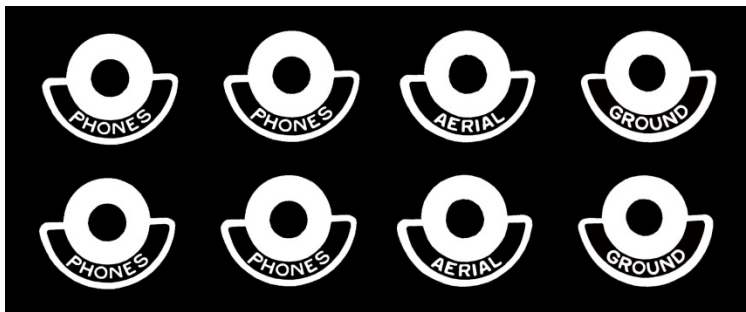
Lac that is no longer available. You apply with cheese cloth several times a day until it has filled-in the missing areas. Of course anything

like this will build-out onto the surface of the adjacent varnished areas. The first inclination is to wet sand the excess, but I found it much easier to use a very sharp cabinetmakers card scraper to plane off the excess lacquer. Works like a charm. The final finish is done with #0000 steel wool followed by waxing.



One thing I discovered too late for my battery box replica is the fact that my poplar boards from the local Lowes home center have UPC labels containing a very aggressive adhesive stuck to the faces of the boards and not to the

board end grain. I found that peeling off the labels was extremely difficult and still left the wood tacky. I then tried to remove the residual adhesive with first alcohol and then lacquer thinner. Unfortunately, while the surface was no longer tacky to the touch, it greatly reduced the penetrating ability of my alcohol based wood dye in the area. Therefore the solvent must have thinned the adhesive enough so it could soak into the wood. I was forced to do touch-up work with more dye applied after having put down my first coat of lacquer. I think the proper way to remove the residue would have been to scrape it off with a sharp blade held perpendicular to the board or with a cabinetmaker's card scraper. Even when you do this, you ought to consider this board face to be 'bad' and orient it to the inside or back of your work.



There are four tags that identify Aerial, Ground & 2 x Phones. These front panel tags were heavily corroded and could not be made presentable. I scanned the tags and use Photoshop to

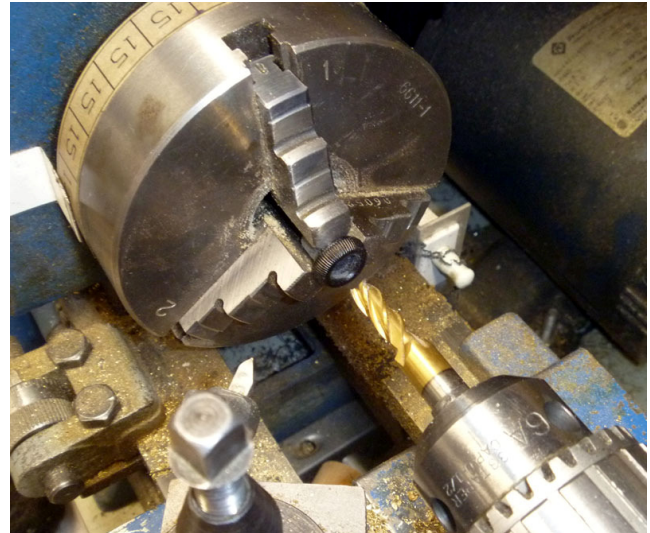
produce new graphics. My local trophy shop has a laser engraver that zapped the graphic onto a small aluminum plate for the grand cost of \$5. I used a punch, nibbler tool and jeweler files to cut the tags to size. The detector/tube module inside the radio has the same style of tags for battery connections but fortunately they are in pretty good shape so were retained.

There are molded Bakelite bushings in the bottom and back of the radio cabinet for battery connections.

Two were

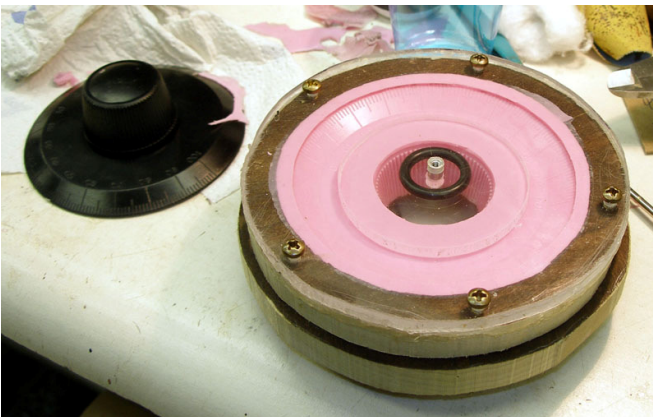


missing and four were damaged. I wanted to make a silicone rubber mold and cast new urethane resin replicas. Because of the damage to the original parts, it took some time to figure out how to prepare them to serve as



masters for making the rubber mold. There was only one cylindrical surface of the original part that could serve as a reference; this is the inside diameter of the bushing. This also provides an axis reference. Foam plugs were inserted in the bushings far enough down to provide a perpendicular surface. The outer damaged cylindrical surfaces of the bushings were covered with very thin polyester sleeves reinforced from the inside with small wood dowel plugs. This made it possible to cast the silicone rubber mold. The mold produces a cast urethane part that now has surfaces that can be machined on a lathe to true dimensions.

The #3 large dial survived only with about 30% of the dial skirt remaining. I looked for years for a replacement dial with no luck. I finally figured out



how I could make two silicone rubber molds from which I could cast new parts for the replica dial. The dial has a brass center insert that joins the skirt to the knob; this is a knurled part that was molded in place. My replica brass insert could not be molded in place and maintain the required precision in alignment. I figured out how to stake the part securely into the skirt. The cast knob press fits nicely into the brass insert. The original special knob, with center hole for the Vernier knob, was with the radio and could be extracted from the brass bushing to make a silicone rubber mold. Since the skirt was to be cast from urethane resin, I did not want the luster of this part to contrast with the original part. What you see on the restored radio for the #3 knob is a total replica. (As it turned out, the replica parts match very closely to the original.)

The nickel plated contacts on the front panel required ultrasonic cleaning to remove heavy corrosion so that they could be polished and re-plated with nickel.



Also the flat head wood screws for the piano hinge of the cabinet top lid

needed plating. The piano hinge, also nickel plated, was rusty but it is too large a part for me to plate. I spent 2-3 hours carefully scraping the rust crystals off the surface. I discovered long ago that frequently rust crystals will grow up through fissures in the nickel plate and spread out for a considerable distance over the surface of good nickel plate. These crystals can be broken free of the nickel plate surface using a toothpick or wood craft stick lubricated with a little waterless hand cleaner like Go-Jo or Goop. The net result is that the remaining nickel plate will appear much better than you ever expected. The hand cleaner is removed with solvent and then the surface is sprayed with a clear acrylic lacquer. There were areas of the hinge where the plating was completely gone due to rusting. There I simply

sanded, applied a very fine Dremel wire brush and then polished with white rouge to yield a bright steel surface. The contrast in color is noticeable but I



have found no way to touch-up such an area with metallic paint that results in any lesser contrast to adjacent real plate.

The spider web coils of the tuner have an embossed paper label glued to the center wooden core. The same label is also glued to the two tuning condensers. The sealed tube module has the same label glued to either end of the module.... I thought one of the

labels was missing but found that it had fallen off, curled-up and become lodged under the module. It proved easy to flatten and glue back in place.

Note that these labels are actually embossed from the back thus making the fabrication of an accurate reproduction difficult.

The tube module is mounted in an unusual manner. There are 3/8" tall spacers made from green dyed very dense felt. Four brass rods threaded 10-24 are mounted to the bottom of the cabinet, a felt spacer is placed on each rod and then the tube module is placed down on the rods. Another felt spacer is placed on the rods and topped-off by a nickel plated cap nut.

I wanted to inspect the insides of the tube module. I removed all the screws and nuts but found that it was not possible to lift the Bakelite panel out of the box. The transformers are potted in asphalt but it appears that the potting must have been done before the wires were connected to the tube sockets, etc. mounted on the Bakelite panel. So you would think that the panel must lift out but no joy here, the panel would lift less than a millimeter. I remembered that I bought a bore scope camera last year with

a right angle mirror attachment. I could stick it down between the tube socket pins to have something of a look-around. The camera is fixed focus but not close enough for useful pictures in this situation.



The composition of the crystal detector is a mystery to me. It almost seems to maybe be a solidified paste of low temperature alloy like Woods Metal and finely ground galena. The 4 page instructions I have barely mention this detector at all; only saying that the cats whisker should rest lightly anywhere on the surface of the material.

Since the battery box was missing, there were no remains of the five wires that would have passed down into the battery box. The setup instructions I have are not specific about how to make use of the battery box but it does identify the colors of wire supplied. I must admit that I have an intense aversion to seeing vintage electrical devices outfitted with modern plastic insulation wiring.

The wiring of the radio is made with 18 or 20 gauge stranded wire that has an extruded black rubber covering with a braided 'old gold' colored jacket. It is presumed that this same style of wire was used for the battery connections. I did not have such wire and therefore elected to make my own by taking white cotton macramé or beading cord from my local crafts &

fabric store and pulling out the stranded core to leave just a braided tube. I stripped PVC insulation off some modern stranded 18 Gauge wire. This wire was fed into 3/32" thin-wall black shrink tubing and the tubing heated to shrink it to its minimum dimension. Then inserted into the dyed cotton braid... This is not an easy task. The braided sleeve is simply a very tight fit over the shrink tubing. The workable solution involves having an excess length to the shrink tubing on one end. This length is clamped on the end in forceps and the end heated with an adjustable temperature heat gun to draw the tubing out to the point it begins to show breaking resistance (about 3 to 4 times its normal length). This length can now be placed in the eye of a loop of #26 solid wire and folded back against itself. The solid #26 wire is fished through the hollow cloth braid. The far end of the 26 gauge wire is clamped in a vise. With tension on the wire and the length of wire inside the shrink tubing, you can slowly work the braid into position. After pulling the dyed sleeve onto the wire covered with shrink tubing, pull the sleeve as tight as possible. Saturate a gauze pad with Dritz Fray-Check PVA seam sealant and drag over the dyed cotton. This will keep the fibers from coming loose.

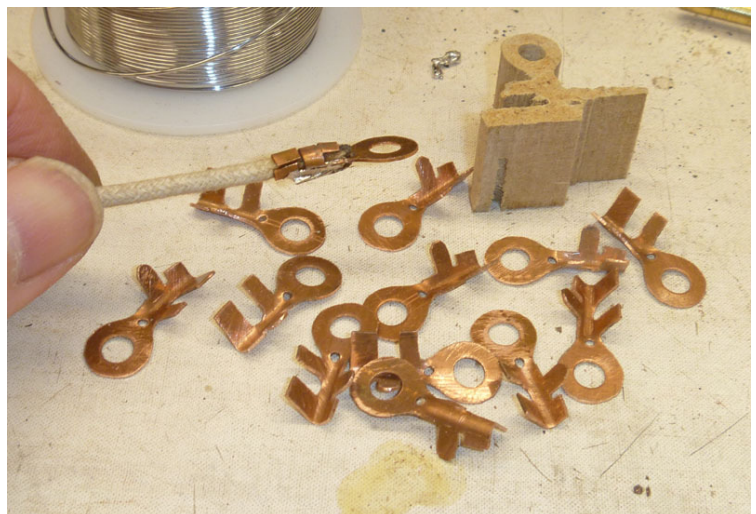
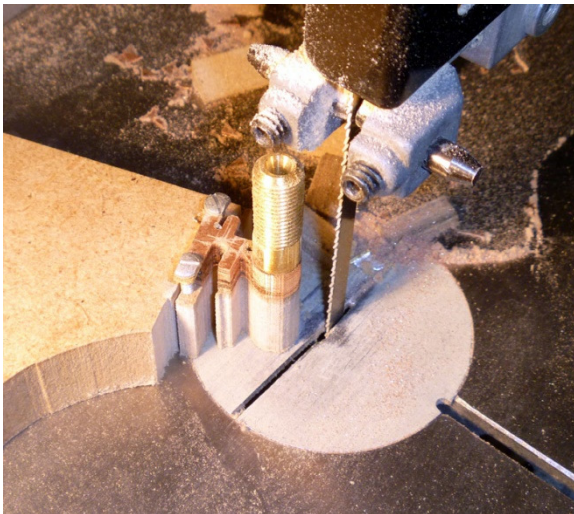
There are 5 colors mentioned for the battery connections; Red, Yellow, Green, Gray and Black. These cotton tubes were dyed with Rit fabric dye. Since I wanted the colors to be strong, you are instructed to add table salt to the solution and keep the temperature of the dye at 140 to 160 F for about an hour. After dyeing, rinse in warm water then cool water. (You do not want salt residue to get on the circuitry of your radio.) I found it convenient to mix dyes in pint Mason jars. I placed all five jars each



containing a length of washed plain cotton braiding on the turntable of my little shop microwave oven. After 5 to 7 minutes on high, I checked the solution temperature using my infrared thermometer; when it indicated I was at temperature, I found that setting the oven to a 'defrost' mode for one hour maintained the temperature pretty good.

The instructions tell you to attach copper ring terminals to each wire to be connected to the back side of the tube module. I noted that there are no special instructions on how to crimp these terminals and I cannot recall seeing any catalogs or magazines of the day that show crimping tools. So the crimping task was likely to have been done with some degree of difficulty with a pair of common slip-joint pliers although radio catalogs of the day did offer small long-nose pliers. After crimping you were instructed to solder the wire to the back of the crimp.

I did not have any copper ring terminals like those used in this radio so I made my own. I have used this technique several times before. A lot of work but satisfying in my quest to preserve as much history as possible.



See Photo Gallery on next pages. I welcome any comments on this preservation project.

Photo Gallery



As found condition.

(Right hand knob removed to make silicone rubber mold.)



Note loudspeaker jack on side of cabinet. There is no mention of this feature in the literature. I presume it was a modification made by the assembler.

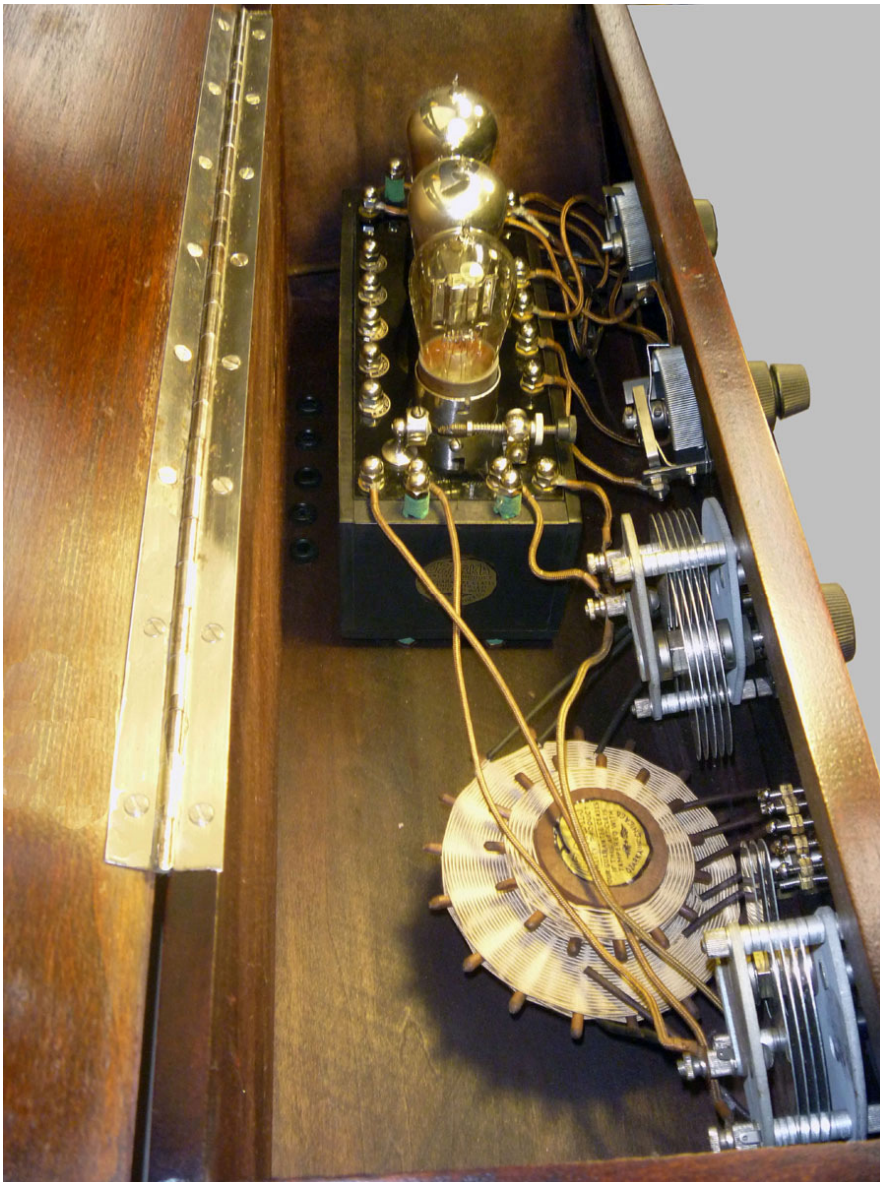
The battery box, #3 knob from the left and i.d. tags for Aerial, Ground & Phones are my reproductions.

Tap switch contacts and piano hinge screws were nickel plated.

Even though the piano hinge is nickel plated, the surviving battery box hinges are Stanley brass plated steel. The two bushings are supposed to be for wires going to a 6 Volt storage battery if you did not use dry cells for the tube filaments.

These bushings are urethane resin reproductions I made.



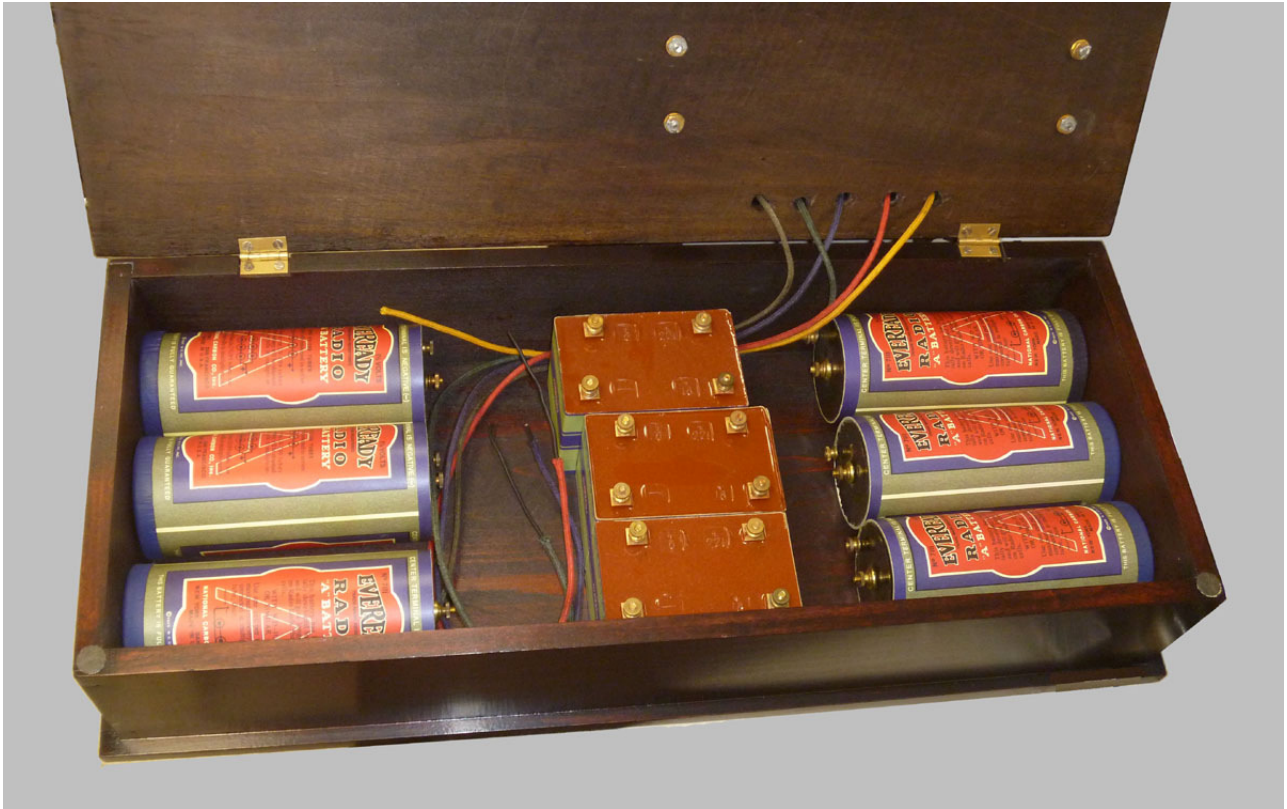


The radio was shipped with all components mounted. The assembler had to remove the panel in order to gain access for wiring. The assembler cut the 'old gold' colored wire to specified lengths and crimped and soldered the wires to copper ring terminals at each end.

Colored wires for power connections were attached to the back of the tube/detector module and pass through Bakelite bushings down into the battery box.



Stripped cabinet showing locking rabbet joints used on back of cabinet and on construction of the battery box.



Note: You had options of what kind of tubes you could use. If you were using dry cell UV-199 tubes, this would have been a good arrangement for the first generation of this set where the tube module indicates a B+ of 60 Volts. (Three 22 ½ Volt 'B' batteries connected in series for the Plate circuits and two – three cell strings of 1 ½ Volt 'A' batteries connected in parallel to provide 4 ½ Volts to the tube filament circuits.)

If you were using UV-200A and UV-201A tubes powered by an external storage battery, this compartment would have had either two 45 Volt 'B' batteries or four 22 ½ Volt batteries. I found it interesting to note that with the specification of 90 Volts 'B', there was no mention of a 'C' bias battery. It seems that 'C' bias to reduce unnecessary 'B' battery current drain did not come into general usage till the latter half of 1924. (First adverts for this set were from around February 1924.)