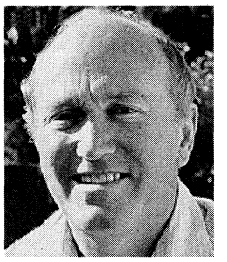
VINTAGE RADIO



By JOHN HILL

Restoring a sick Radiola

Getting an old receiver working again and having it working well are two different things. This month's story is about a 1938 model 5-valve Radiola that didn't really make the grade with its initial restoration.

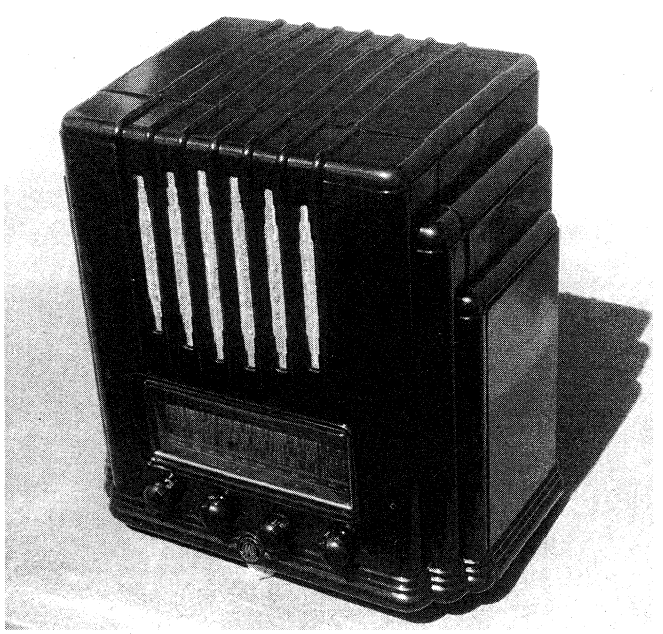
Restoring valve type radio receivers is a rewarding hobby for many vintage radio enthusiasts. Personally, I find the "getting them going" aspect the really interesting part of the process, particularly when one starts out with a completely inoperative piece of equipment. It is indeed satisfying to hear such a set burst into life after being silent for many years.

The old Radiola was bought to me by a collector friend to see if I could find out what was wrong with it. Basically, the set worked on strong transmissions but the weaker stations just weren't there. It also performed worse at the high frequency end of the dial than at the low frequency end. As stated earlier: working and working well, are two different things.

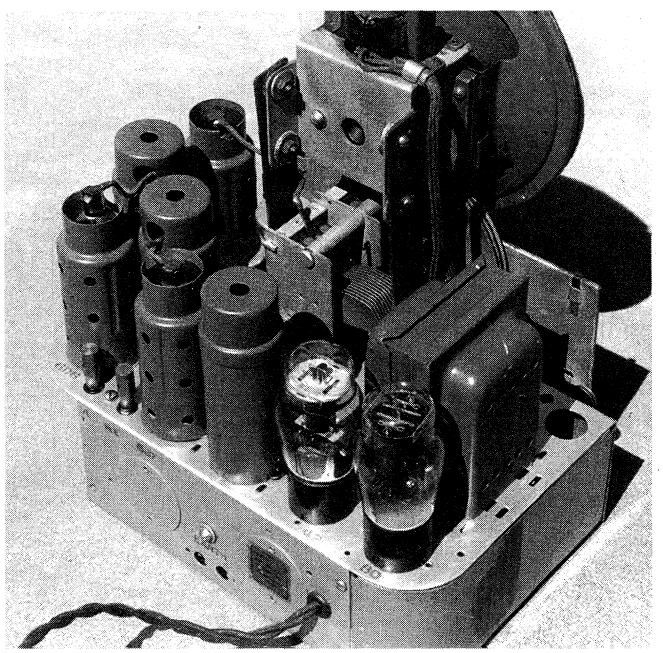
At first glance, the set appeared to have been reasonably well restored. All paper and electrolytic capacitors had been replaced, even if the majority of these components had been substituted with secondhand parts.

While there are lots of serviceable secondhand capacitors about (and I have used plenty myself over the years), the ones fitted to this old Radiola would have to be considered suspect until proven otherwise. These capacitors had been removed from junked black and white TV sets (where he found these I'll never know) and installed in the Radiola without being tested, so a faulty capacitor looked like a good possibility.

Unfortunately, in order to test such capacitors they must first be isolated, which involves unsoldering one connection on each capacitor. Each capacitor was checked in turn with a megohmmeter set to the 500V range. As it turned out, however, all the old polyesters tested perfectly without the slightest hint of leakage. The electrolytics also checked out OK.



This late 1930s Radiola had two serious faults: a defective IF transformer and a loose voice coil winding in the loudspeaker which produced less than perfect results.



The old Radiola was a fairly compact receiver for its era, as this top view of the chassis shows. The set had been reasonably well restored using mainly secondhand parts.

Old valve radios also have mica capacitors and these can sometimes break down and cause all sorts of trouble. As a result, these were also disconnected and tested for leakage at high voltage. They all passed the test without problems.

The resistors were next and each one was checked to see if it measured what it was supposed to. All this test revealed was that they were all well within their normal 20% tolerance.

At this stage, I decided to check all the valves. And once again, in keeping with the previous tests, they were all in excellent condition. So far, quite a lot of time had been spent getting absolutely nowhere!

Set procedure

Whenever I do a restoration, I have a set procedure which starts with continuity checks on a number of critical components in order to establish their serviceability. These components are: the aerial and oscillator coils, the intermediate frequency (IF) transformers, the high-tension filter choke or field winding, and the output transformer. In addition, I also check the primary and secondary power transformer windings.

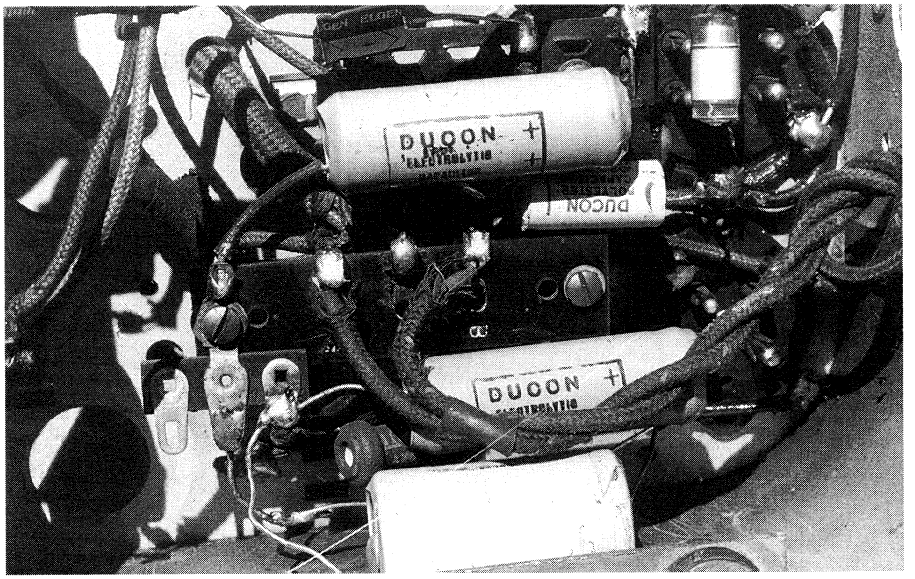
It was time to apply these checks to the old Radiola. The fact that the set was working at all had drawn my attention away from these components which are normally the first things I check.

Sure enough, a major fault was soon located. The first IF transformer secondary winding was open circuit. This malfunction reduced the radio frequency signal to the IF amplifier valve, so it was no wonder the set performed so badly. In fact, it is a miracle it worked at all!

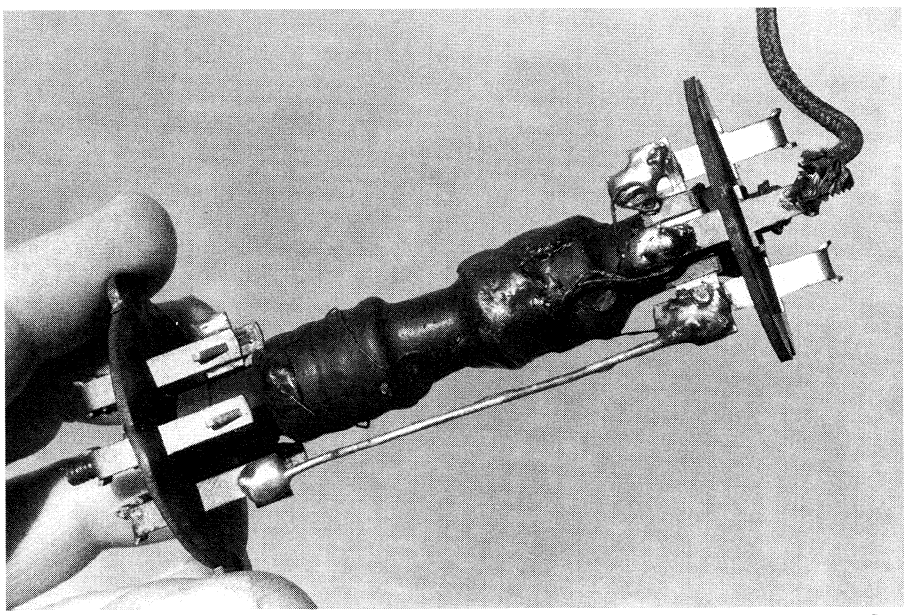
A closer inspection revealed that the iron core adjustment for the transformer secondary had also been adjusted fully in. This would be part of the reason for some RF transfer to the IF amplifier valve.

Perhaps if I had used my signal tracer to help sort out this problem, the faulty IF transformer would have been found sooner. But as the old signal tracer is too big to fit comfortably on the workbench, it is only used as a last resort when all else fails.

The solution to the problem was to either repair or replace the defective IF transformer. The first step was to remove it from the chassis and this was done after making a sketch of the wiring connections. Wiring sketches are a good habit to get into when removing major components for repair.



The restoration had been done using secondhand capacitors stripped from an ancient TV receiver. Although initially suspect, they all tested OK.



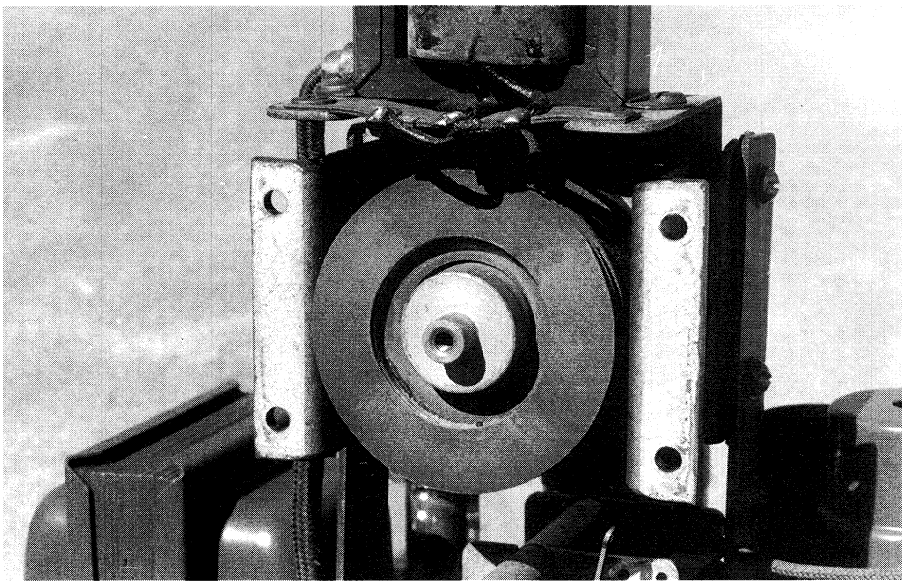
This is the repaired IF transformer. Corrosion breaks can often be reconnected, thus restoring the transformer to working order.

The transformer windings were of multi-strand (Litz) wire and one end of the secondary looked very suspect where the wax coating had cracked open due to aging. Several turns had to be removed before the break was found and testing with an ohmmeter revealed continuity from that point to the other end of the winding.

Fortunately, a few turns less on the secondary winding would have little affect on the IF transformer operation. Because the transformer had an adjustable iron core, it would be easy to compensate for the lost turns. What's more, no special winding technique would be required to replace the unravelled wire. All I would have to do is remake the termination and reseal the exposed wire with wax.

A distinct rattle

That simple repair solved the poor performance problem of the old Radiola and, after a quick alignment session, the set worked quite well. However, this improved performance brought to notice another fault which



This view shows the defective loudspeaker with the frame and cone removed. Shown is the central pole piece (electromagnet) surrounded by the hum-bucking coil. The output transformer is mounted on top.

This piece (and several other pieces) of foam plastic behind the speaker cone indicate a previous attempt to eliminate the cone rattle. Because the voice coil assembly was loose, the attempt was unsuccessful.

would require attention before the restoration could be called complete.

When the volume was turned up, there was a distinct rattle from the loudspeaker. This is a common problem in old speakers and is often caused by the cone separating from its outer rim. Alternatively, the rim can come adrift from the speaker frame.

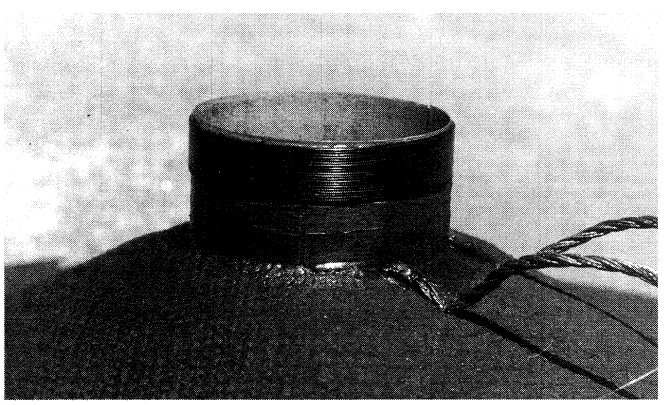
However, after checking these possibilities the rattle was still there. This can leave only a few other possibilities: either a loose voice coil or voice coil winding, or the voice coil polling on the magnet.

One good feature of many old electrodynamic loudspeakers is the fact that they can be dismantled and repaired. Back when these speakers were commonplace, new speaker cones and field windings were available as spare parts, thus making them reasonably easy to repair when things went wrong. During the latter part of the electrodynamic era, however, the loudspeakers were riveted or spot welded together which effectively ruled out disassembly and repair.

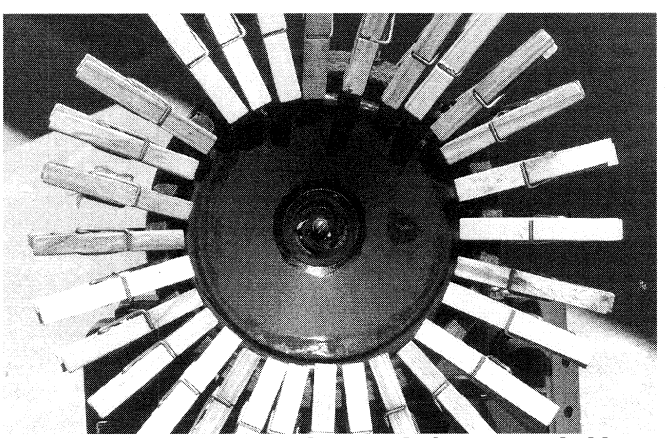
After removing the speaker cone (with minimal damage) the trouble spot was clearly visible – the voice coil winding was loose. It had also been rubbing on the close fitting frame and the enamel insulation on the wire had been worn away from the outside of the coil.

A simple remedy

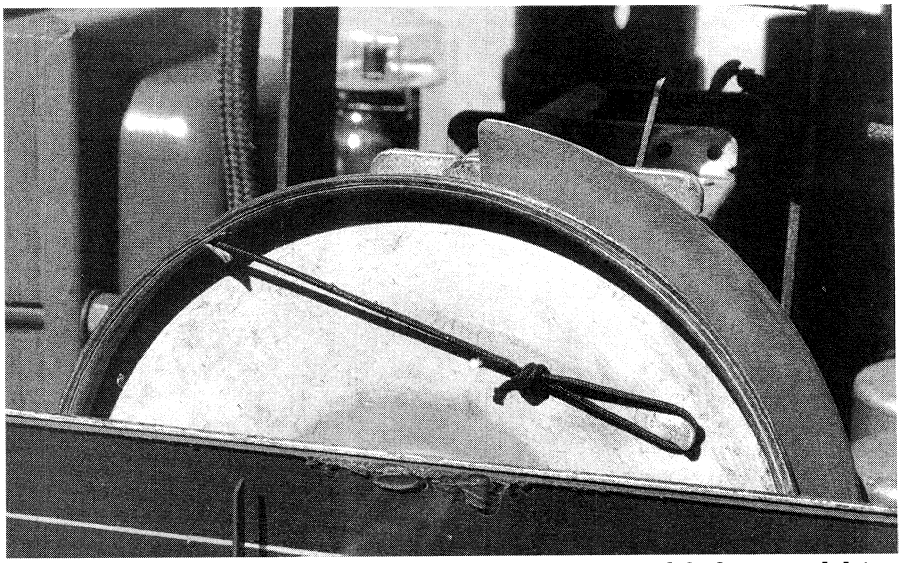
The remedy was simple. The voice coil was given a couple of coats of Shellac (although any lacquer will do) and the close-fitting ring in the frame that encloses the voice coil was slightly enlarged (in a lathe) to give the coil a little more clearance.



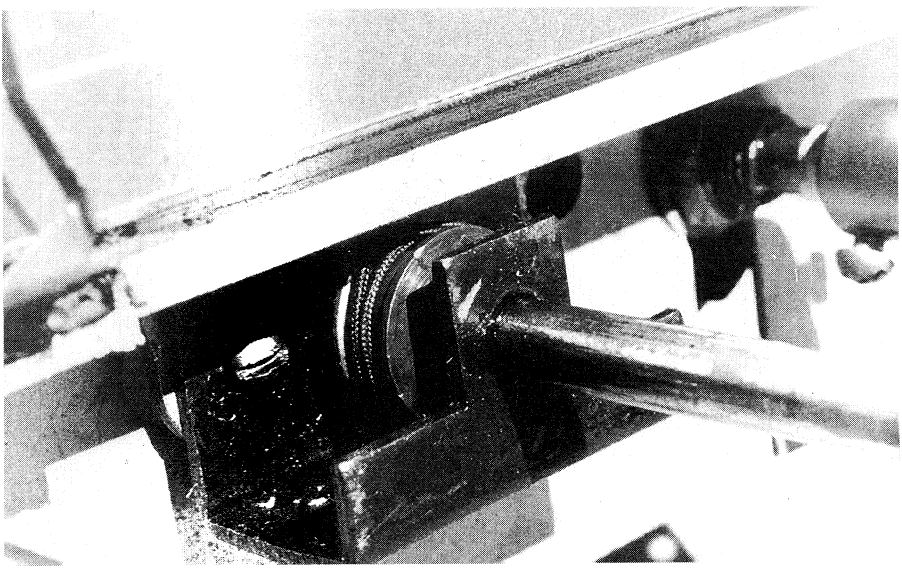
A few coats of Shellac solved the loose voice coil problem. The voice coil is wound on a thin cardboard former which is inclined to go out of shape over a long period, thereby loosening the coil.



Reglueing the cone required many clothes pegs to hold it in position. Several thin strips of shim brass were used to centralise the cone.



The friction drive dial mechanism had been previously modified to a cord drive. Note the cord drum in front of the old drive plate.



This is the bottom end of cord drive modification. The job was quite well done and is the logical thing to do if the original friction drive mechanism is badly worn or if parts are missing.

The cone was then glued back in position and held in place with clothes pegs until the glue dried. Three strips of "five-thou" shim brass were used to centre the voice coil around the electromagnet central pole piece prior to clamping the rim of the cone with the pegs.

It was a totally successful repair. The cone was quite free at the centre and the irritating rattle was completely cured.

Perhaps the most pleasing aspect of these two repairs is that, by spending a little time and effort, they resulted in the receiver working normally again. Some vintage radio repairers go to a lot of trouble tracking down hard to find spare parts when the existing parts can often be reclaimed with a little perseverance.

Nothing ventured . . .

When attempting a repair on a broken down or malfunctioning component, one has nothing to lose. If the job is unsuccessful, then you are no worse off for trying. If it is successful on the other hand, then you are well in front and have not only saved yourself some expense but have gained a great deal of satisfaction from fixing something that others may consider unserviceable. **SC**