

By JOHN HILL



Some simple repair techniques

Every now and then I devote my vintage radio column to a getting out of trouble theme. This usually covers various repair techniques that have helped me overcome some of the many problems encountered while restoring old radio components to working order.

Several months ago, I described the restoration of a 1932 model Howard, a 4-valve console radio with turned legs. In this particular story, mention was made of repairs to the dial drum, the tuning capacitor and the speaker transformer, but few details were given as to what these repairs actually involved. This month's column will give those details.

The dial drum was the most troublesome of the three repairs, simply because it is an old diecasting. Modern diecastings are of good quality

and give little or no trouble, but the diecastings of 50 years ago are another matter. Unfortunately, a considerable number of old dial components were diecast and can present the vintage radio restorer with many a headache.

Most early diecastings were made of zinc and when first manufactured they were perfectly OK. However, due to impurities in the zinc, the metal was not stable and over long periods of time it became distorted and very crystalline in its grain structure. This

ageing effect resulted in extreme brittleness.

The weak nature of the Howard's diecast dial drum became apparent when it was gripped lightly in a lathe chuck - it simply fell to pieces as one of the accompanying photographs clearly shows. The centre piece had already been broken and the lathe effort succeeded in reducing the drum to five individual bits.

This problem could have been solved by giving the shattered remains to my brother Alan (who is much cleverer than I). If necessary, he can cast a new aluminium dial drum for me using the reconstructed original as a pattern.

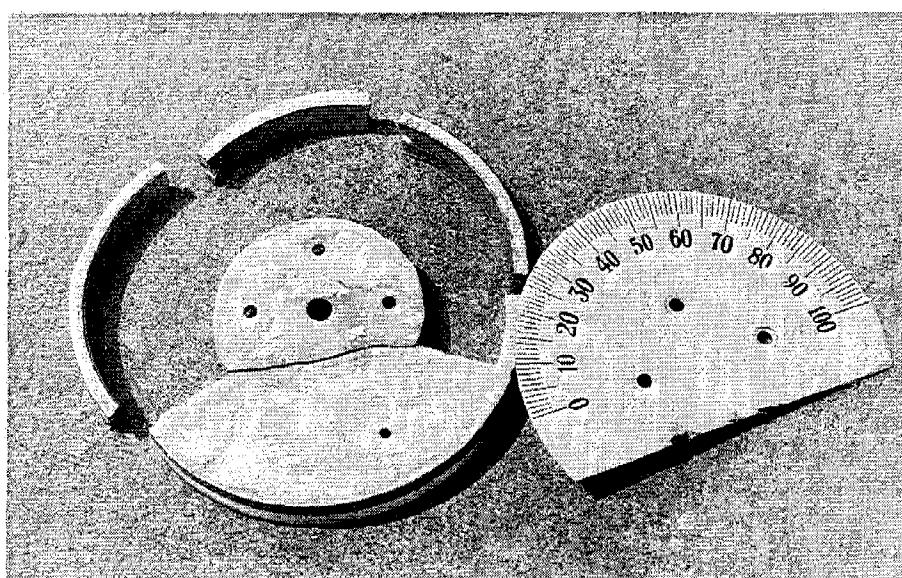
However, getting someone else to fix things is cheating a bit so I decided to do what other collectors would be forced to do; to repair the part by gluing it back together again. If the repair fails at some time in the future, then brother Al may have a job to do after all.

The glue operation worked out reasonably well and the dial drum is now in one piece again and fully operational. Araldite® was used as an adhesive although Superglue® may have been stronger. The problem when using Superglue® is that it does not allow sufficient time to accurately position the bits before it sets.

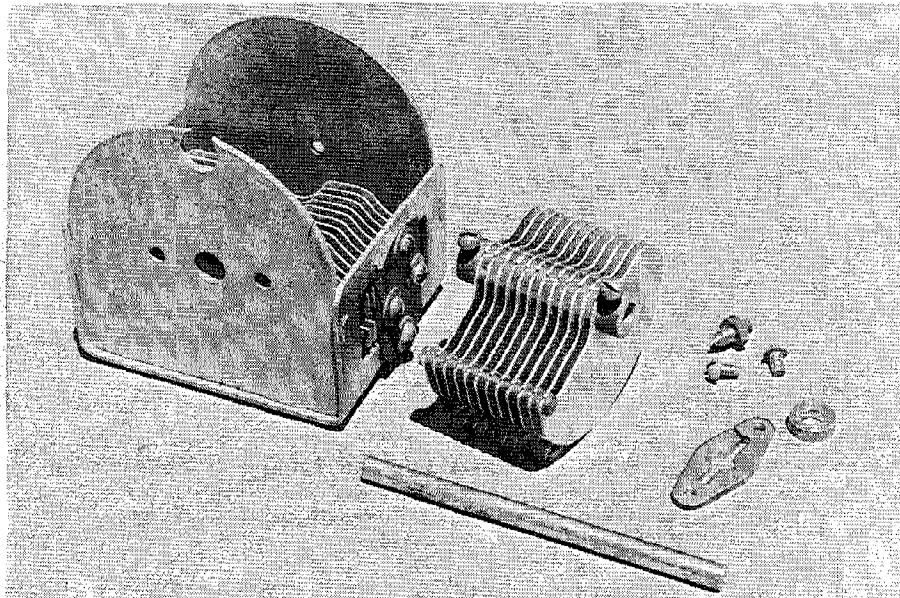
Vintage radio restorers should take heed of the problems one can encounter when working with old diecastings. Simply dropping a diecast component on the floor could shatter it into a dozen or so pieces. The nickname "muck-metal" is most appropriate for old diecastings.

Tuning capacitor

The tuning capacitor on the Howard is a simple single section type, typical of regenerative detector receivers of



This dial drum became a problem when it broke into several pieces after being lightly clamped in a lathe. The unit was subsequently repaired by gluing the pieces together using Araldite®.



This dismantled tuning capacitor is from my 4-valve Howard receiver. Tuning capacitors are much easier to clean & repair if they are first removed from the chassis and dismantled.

that era. It is of plain bearing construction and, like most old tuning capacitors, was in need of attention in the bearing department. Not only was the front bearing quite loose but the unit was also in need of a thorough clean-up.

There is only one way to successfully service a component such as a tuning capacitor and that is on the workbench. Trying to repair one while it is still attached to the chassis can be rather awkward. It was therefore removed for servicing.

Dismantling the tuning capacitor

was easy. Two screws held the moveable plates to the control shaft, while another two screws secured the main bearing to the front endplate. The rear bearing consists of a 60° tapered setscrew (with a lock nut) which bears in a centre hole at the rear of the control shaft.

Front bearing

As can be seen in one of the accompanying photographs, the front bearing is split and the excess clearance is taken up simply by squeezing the sides of the bearing together with a pair of

pliers. Such a bearing should be adjusted so that it is a light drag fit on the shaft.

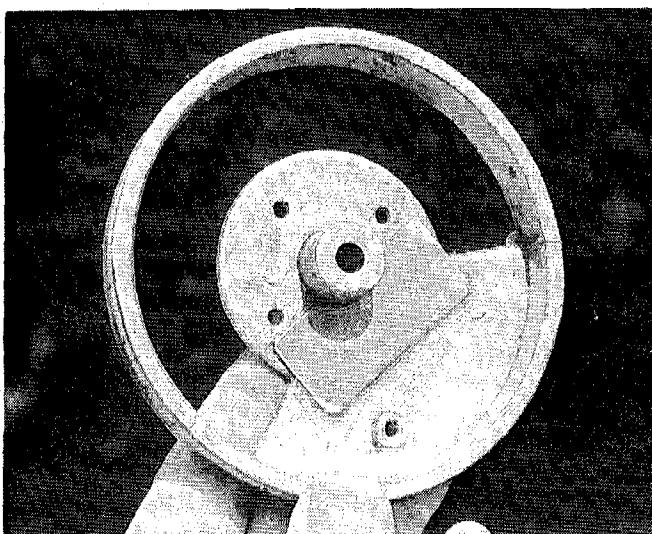
Because the tuning plates were not centrally spaced, the front bearing was packed with a thin cardboard gasket. This made up for the discrepancy caused by wear in the thrust bearing.

The thrust bearing takes the pressure that is exerted by the adjustable setscrew at the back of the tuner. Once again, only gentle pressure should be brought to bear on the thrust bearing and the rear setscrew was adjusted accordingly when the unit was assembled.

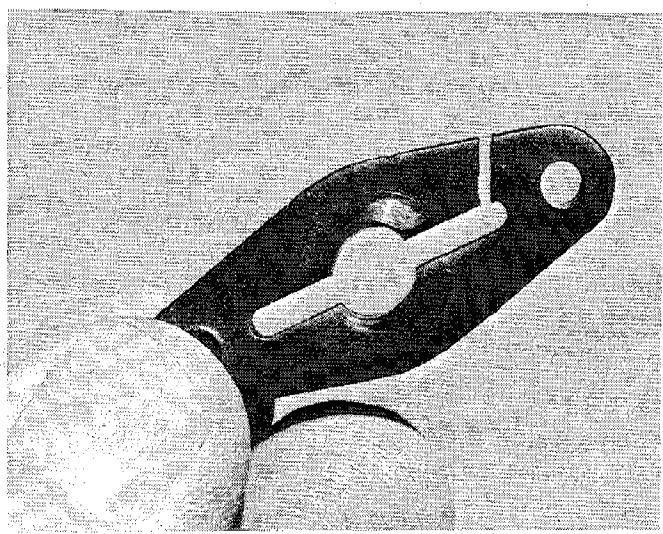
The moveable plates of the tuning capacitor are earthed through the front bearing, the thrust bearing and the rear setscrew. Therefore, these bearing surfaces need to be clean and under tension in order to give a reliable noise-free earth connection.

The combined bearing pressures resulted in a noticeable resistance when the control shaft was turned. However, when the dial drum was fitted, the extra leverage of the large diameter drum reduced the resistance to a seemingly negligible amount and the dial cord drives the unit without slipping.

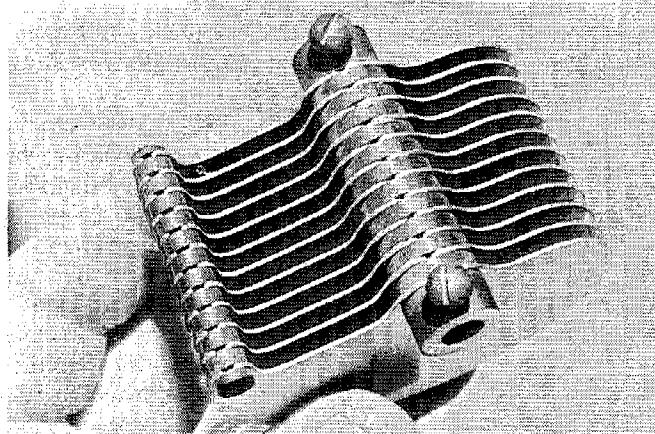
Similar repairs may also be required in more elaborate receivers, such as TRFs with multiple gang tuning capacitors, particularly if the capacitor is of the plain bearing type. Once again, the job is made easier if the capacitor is removed from the chassis.



The completed dial drum, after it was glued back together again. Note the steel plate that's used to reinforce the centre section. If further problems are encountered, a new dial drum will be cast using aluminium.



The Howard's tuning capacitor uses a split front main bearing. This is adjusted by squeezing the sides inwards using a pair of pliers. The bearing was also packed with a cardboard spacer to compensate for wear.



The moveable plates are secured to the control shaft by two grub screws and are earthed via the front and rear bearings. These bearings should be clean and under tension to ensure a reliable connection.

With multi-gang capacitors, it is also advisable to check the capacitance of each gang. This can be done using a digital multimeter which has a capacitance range. If necessary, minor capacitance adjustments can be made by bending the outside moveable plates.

Loudspeaker transformer

The final repair to the old Howard involved replacement of the output or loudspeaker transformer. This problem took a while to locate at the time because the speaker was working prior to removing it from the cabinet. For reasons unknown, the speaker then stopped working and, looking back, it was probably the cleaning brush and a blast of compressed air that did the dirty deed. A defective speaker transformer is a very common fault in vintage radios.

In days long gone, speaker transformer failure was so common that special winding replacements were made for the job. Instead of replacing

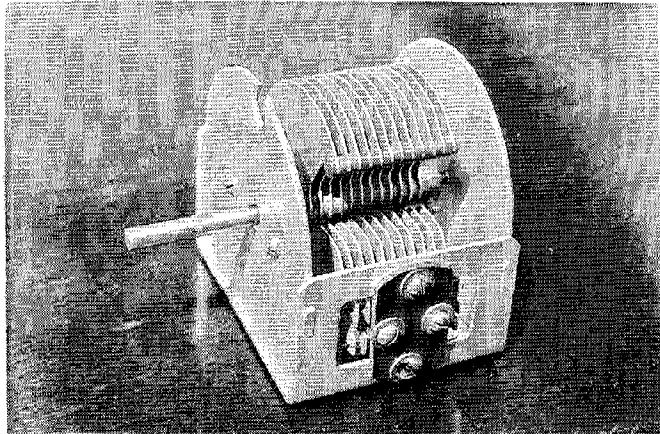
the whole transformer, the transformer laminations were split and the defective windings removed and replaced with new windings (see photo).

The problem is, such spares are no longer available and, if trouble is encountered, replacement of the defective unit is the only real alternative. A secondhand unit is not always the answer, however. The replacement may last for years or it could pack it in the next day. One never knows!

Obviously, a new transformer is the better approach but such devices are now difficult to obtain. There is, however, another alternative.

Most present-day electronics dealers stock audio line transformer as standard items. These transformers have tapped primary and secondary windings, are rated at four watts and cost about \$7.00.

According to the Dick Smith Electronics catalog, their audio line transformer (Cat. M-1100) has both $2.5\text{k}\Omega$ and $5\text{k}\Omega$ primary taps; 2, 4, 8, and 16Ω secondary taps; and is rated at



Just like new - the Howard's tuning capacitor after cleaning, painting and re-assembly. The old plain bearing tuning capacitor is serviceable once again & was subsequently refitted to the Howard receiver.

4W. It is intended for use with PA systems on 70V or 100V lines.

On the basis of the above specifications, these transformers would seem to be well suited to the task. The $5\text{k}\Omega$ primary is close to the $7\text{k}\Omega$ impedance specified for most pentode output valves, while the secondary taps would accommodate any likely loudspeaker voice coil.

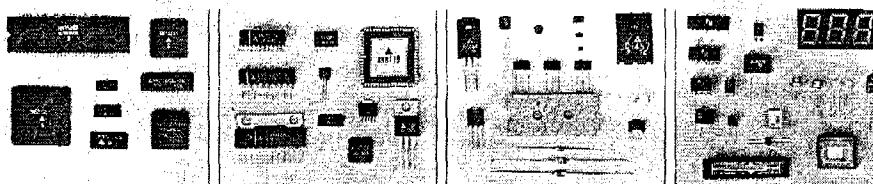
While these transformers are not valve output transformers in the true sense of the term, they do the job very well. I have used dozens of them as speaker transformers in a wide variety of applications and they have all worked quite OK. They are a convenient over-the-counter substitute and if anyone is having a supply problem in this regard, then at least give them a try.

The main limitation of these transformers is that, being designed for line work, they don't have an air gap. This is normally provided in a transformer designed to carry direct (plate) current, as well as audio. The practical result would be reduced inductance and some loss of bass response.

Many early speaker transformers had a small tagstrip attached to them. This tagstrip terminated the transformer leads and the leads from the radio and to voice coil. A modern line transformer will not only lack this tagstrip but will also be too small to fit the original mounting holes. This makes installation quite difficult.

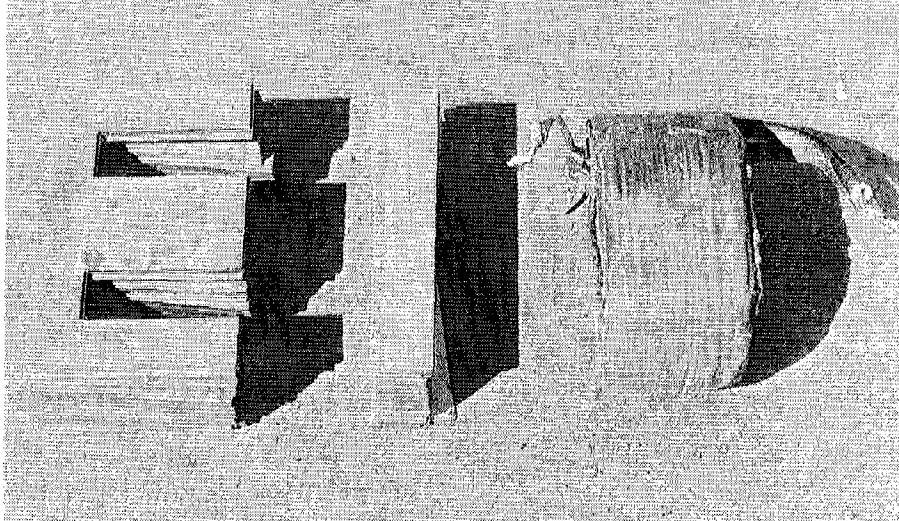
This problem can be overcome by simply installing the new transformer in the old mounting cover. The excess space can be taken up by inserting wooden wedges down the sides to

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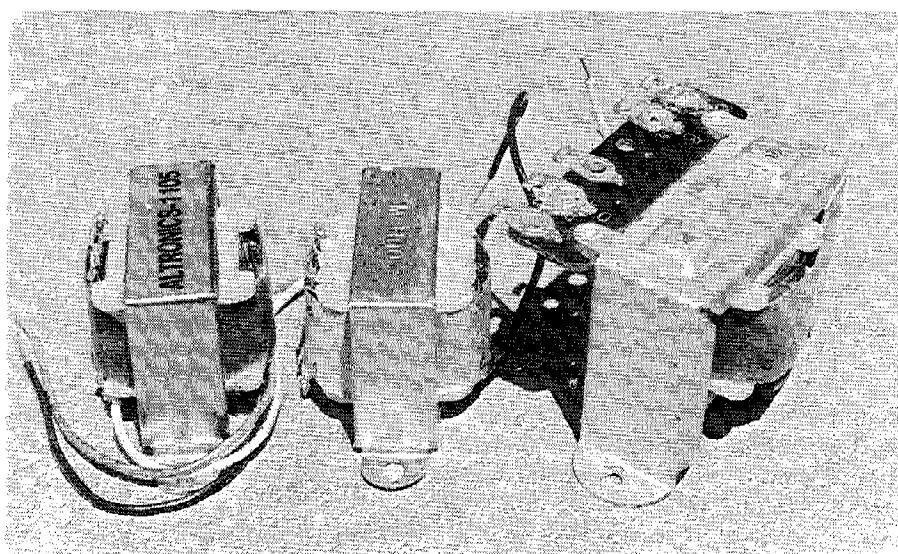


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Old speaker transformers were made to be serviced and new windings could be installed with little effort. Unfortunately, the windings are no longer available as spare parts.



Modern audio line transformers such as the Altronics 1105 (left) and the M-1100 from Dick Smith Electronics (centre) make useful replacements for defective speaker transformers. The unit at right is an 1105 that's been transplanted into an old transformer mounting cover.

hold things in place. If the wedges are installed with a liberal application of "Silastic", the new transformer will be held quite securely in place.

One favourable aspect of using the old transformer mounting cover is that it makes the replacement transformer a good deal less noticeable than if it were mounted by itself. What's more, because the old transformer cover usually has the tag strip riveted to it, the original wiring arrangements can be maintained.

Maintaining appearances

The originality aspect of a vintage radio restoration is usually quite im-

portant. If a receiver still looks original after it has been restored, it not only gives the restorer a great deal of satisfaction but the set also retains its value. On the other hand, if the set obviously looks as though it has been modified with inappropriate replacements, then the illusion of a desirable old original fades a little.

Restoring original parts to working order and disguising modern components to look like old are just some of the problems the vintage radio repairer has to come to terms with. How well these repairs are done is up to the skill and determination of individual restorers.

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