

More precisely, it was a Kriesler "Multisonic" radiogram; the kind of thing that was popular 15 or more years ago and which was valued as much as a piece of furniture as it was as an entertainment unit. Using valve technology and fitted with a conventional record changer, they were nevertheless capable of quite reasonable reproduction, even if not equal to today's standards.

This particular model boasted a more impressive than usual cabinet, and must have cost a lot of money when new. It occupied a prominent place in the lounge room and I couldn't help noticing it when I walked in. I mentally registered that I hoped nothing would go wrong with it, because valves and other replacement parts are becoming increasingly difficult to obtain.

Unfortunately, it was already in trouble. No sooner had I pronounced the TV set back in operation than the customer pointed to the radiogram. "I wonder if you'd listen to this and tell me what you think. It failed in one channel some months ago and I got a bloke in to fix it, but I'm sure it isn't right. Tell me what you think."

So saying he switched it on, selected a record, and set it spinning on the turntable. I listened for a few seconds and then swung the balance control through its full range. Then I knew the customer was right; the right hand channel sounded horrible. There was no bass response and what signals there were, were noticeably distorted.

When I confirmed the owner's suspicions he immediately wanted to know if I would have a look at it. I said I would, but I first raised the matter of the previous serviceman. Shouldn't he be given a chance to put things right? It transpired that he'd been given his chance already, several times, but had never put in an appearance.

## **A CIRCUIT HELPS!**

I removed the back of the cabinet and was gratified to find a circuit diagram pasted to the inside of it. The circuit was fairly conventional for that vintage. Each amplifier consisted of a 12AX7 pre-amplifier, plus a couple of 6GW8 triode/pentodes. One triode section functioned as a second amplifier, the other triode as a phase splitter, and the two pentodes as output stages.

The pentodes worked into a 7000 ohm per side speaker transformer, with a 15 $\Omega$  secondary feeding a low-range, mid-range, and high-range speaker system.

The next thing was to get the chassis out; a rather complicated procedure involving the removal of sundry knobs, escutcheons, screws, bolts, panels, etc, but it was eventually accomplished. And the first thing I noticed was that one of the speaker transformers had obviously

## THE SERVICEMAN — continued

been replaced, being smaller and of a different make to its mate in the other channel.

But that was only the beginning. Closer examination revealed that it was only a single-ended transformer and I was intrigued as to what clever trick my predecessor had pulled to enable a single-ended transformer to be used in a push-pull circuit.

In fact, the explanation was amazingly simple; he had wired the transformer into the plate circuit of one of the output valves and left the other valve to its fate — including an open plate circuit and a red hot screen! Small wonder that it sounded horrible. (Fortunately for the valve concerned, the set had not been used after the owner's brief trial run following the repair.)

In fact, I would nominate that gentleman for the OSA — Order of the Striped (butcher's) Apron.

More to the point, what was I going to do about replacing the bodge transformer? I had little doubt as to why it had been fitted; the right one was obviously no longer available, at least from the normal sources.

I explained the situation to the customer, including the possibility that it might take several weeks to find a suitable replacement. He was quite resigned to the delay, but he emphasised that he was very keen to get the set working. Quite apart from not wanting to throw out a nice piece of furniture, he and his wife genuinely enjoyed its sound and had built up a collection of cherished records.

### NEW TRANSFORMER?

And so the search began. I didn't even bother to ring the makers, reasoning that they would long since have written off this particular model. Instead I tried a couple of my regular suppliers of bits and pieces, who are pretty good at finding hard-to-get bits. Unfortunately, neither was able to help in this case.

So then I did try the makers. The result has its amusing side in retrospect, though it didn't seem funny at the time. The storeman I contacted was only a young bloke and he literally didn't know what I was talking about when I mentioned a transformer for push-pull valves. The truth is, he was probably still in primary school when this set was made.

To give him his due he did check with someone higher up — and presumably older — and finally came back with the answer I expected, no stocks.

So where did I go from there? One avenue was via my amateur friend. He had a well stocked junk box, as did most of his on-air friends. Surely one of them had such a transformer tucked away somewhere. In fact, two of them did come good with partial solutions. Neither was the correct impedance ratio,

and both were physically much too large to fit on the chassis. They would have to be mounted outboard.

I decided to treat these as a last resort in the event that all my other efforts failed. At least I now knew that I had a chance of fixing the set, one way or another. More weeks went by, and I had almost given up when an advertisement appeared in this magazine by a warehouse that was clearing out a lot of old stock.

And amongst it were some 7000 ohm per side speaker transformers which, from the illustration, looked exactly like the one I wanted. A phone call confirmed the availability, but revealed one nasty fact that no one had bothered to mention; the ratio was 7000 per side to two ohms, not 15 ohms.

### WORTH A TRIAL

Disappointing though this was, I decided to take a punt. The cost involved was not very great and, in spite of the serious mismatch, I thought it was worth a try. If it proved totally unsuitable I would be only slightly worse off and could still fall back on one of the outboard arrangements.

So it was that I fronted up to the customer again and set about fitting the new transformer. Physically, there were no problems; it was an exact match for the original unit.

I wired it in temporarily at first. For one thing the feedback voltage was taken from the secondary and it was a fifty-fifty chance whether I would get the phase right the first time. By Murphy's Law, of course, the odds were a lot worse and, at switch-on, the speaker gave forth a fearful howl.

That was quickly corrected and then came the crucial test; what did it sound like? To be honest it was far better than I had hoped, and was certainly a far cry from the horrible performance of the previous bodge set-up. More exactly, I could not pick any difference between this channel and its stereo mate. And I need hardly add that the customer was delighted.

I tidied everything up, fitted the chassis



*'I'll be back, Doc. I'm afraid it's going to take four or five adjustments!' (From "PF Reporter")*

back in the cabinet, collected my fee, and left a happy customer to drool over his restored unit.

But how had I been able to get away with such a gross mismatch? Or had I really been guilty of the same kind of butchery for which I had condemned my predecessor, though perhaps in a more subtle way?

Judging on results alone, I don't think I need apologise. The previous effort had produced distortion that was obvious even to a non-critical ear, while my effort had produced a result which was acceptable to my own ear, which I regard as fairly experienced. What's more, I had given the customer plenty of opportunity to assess that performance before accepting it.

As for getting away with such a gross mismatch, I must confess to being agreeably surprised. The truth is that a pentode is a fairly critical device in the matter of load. Variation either way from the optimum results in both reduced power output and increased distortion.

Granted, a speaker load is not constant at all frequencies anyway, but this doesn't alter the fact that the theoretically correct load is the best place to start from, before introducing the inevitable variables.

In this case there appear to be a number of factors which worked in my favour. One is that these systems were, in a way, considerably over designed. The push-pull pentodes were capable of delivering between eight and 10 watts in this configuration, and were feeding highly sensitive speakers.

Because of this speaker sensitivity it is unlikely that they would ever be asked to deliver more than a fraction of this in a typical lounge room situation; probably a few hundred milliwatts average, peaking to a watt or so. In these circumstances the inherent distortion would be low anyway.

### BUT IT WORKED!

The other important factor is the negative feedback system; something which can correct a multitude of faults. Granted the amount of feedback would be down somewhat, but even a small amount of feedback can still be very effective. In addition, the reduced feedback would tend to offset the loss of sensitivity caused by the mismatch, and help to keep the two channels equal. In fact, there was no noticeable imbalance between the channels.

So there it is, my effort at keeping "old faithful" going for a few more years. Hopefully, the owner will get a lot of pleasure out of it. But the really interesting thing about both these stories is that neither worked out as might have been expected. The antenna site which should have been a good one gave poor results because it was too good, and the output transformer gave good results where one had every reason to fear that they might be poor.