

VINTAGE RADIO

By JOHN HILL



The 5-valve Airking console receiver

A guy came to see me the other day with a vintage radio repair. It was a 5-valve Airking, a console receiver from 1937 with an 8-inch (200mm) Jensen electrodynamic speaker. The radio had been in his family for several generations and it was my job to restore it to working order.

The Australian Official Service Manual for 1937 lists no Airkings in its index. Obviously, the receiver was one of those made by one manufacturer but sold under another name. Just who made the chassis is anyone's guess but the rubber-stamped "Airking" name on the dial indicates a badge-engineered job without a decent badge to go with it.

My initial inspection of the chassis gave me a few misgivings about the

repair. There were several problems that I could see immediately: (1) some of the loudspeaker connections had come adrift from the plug and the cone had several rips in it; (2) the dial pointer was missing, which meant that another pointer would have to be substituted or made; and (3) the set used European (Philips) 8-pin, side-contact valves.

That last problem could have proved a major stumbling block. Although

the European valves work just as well as any other type, they are now hard to find and expensive to buy. In fact, this problem had already been encountered at some time in the past as one of the sockets had been replaced with an octal socket and valve.

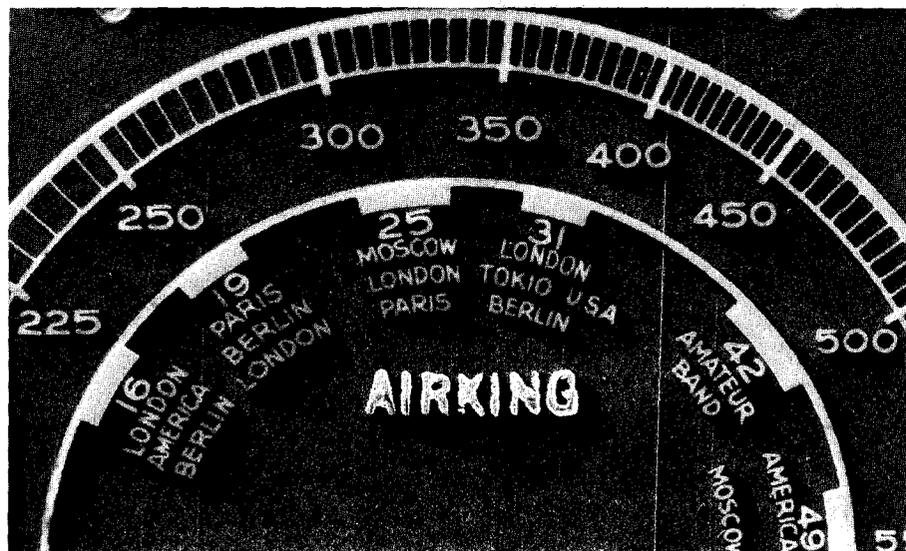
Fortunately the owner wasn't at all fussed about originality. He just wanted the set to work and didn't care what had to be done to achieve that goal. I like customers like that!

On closer examination, it was discovered that the Airking was fitted with two power rectifier valves: (1) an EZ2; and (2) its octal equivalent, a 6X5, in the odd octal socket. But while the EZ2 was clearly occupying the rectifier socket, it appeared that the octal socket was actually intended as a detector stage. Just why it was now fitted with the 6X5 was a mystery.

I suggested to the owner that this was probably the result of someone filling an empty socket, simply to make the set look complete. I have seen many radios fitted with all sorts of inappropriate valves and believed this to be the case with the Airking. However, the owner had known the set for a very long time and was inclined to reject this theory.

Unfortunately, the cardboard valve placement diagram had been torn and the missing portion that would have shown the original valve type was missing. It did, however, indicate that the original power supply rectifier was an EZ3. This is similar to the EZ2 that was fitted but has higher ratings. It was all rather confusing.

It was time to investigate the octal socket, to determine what sort of valve it may have had in it. Checking the wiring revealed only four connections to the socket and, to my surprise, these tied in with the 6X5 rectifier. These



The rubber stamped "Airking" name on the dial indicates a badge-engineered job without a decent badge to go with it. It would appear as though the Airking was produced for the lower end of the price range.

connections were heaters (2), cathode (1) and the joined plates (1).

The mystery was solved when the missing part of the valve layout diagram was found in the box in which chassis was packed. Much to my surprise, the original valve in this position was also an EZ3 and it really did function as the detector stage.

This is the first radio receiver I have seen that used a power rectifier as a signal diode for detection purposes. Although the Airing appears to be a 5-valve receiver, the receiving part of the set amounts to only three valves. No doubt it was sold as a 5-valve radio but really, it's not!

Why the manufacturer didn't use a duo diode triode (as was common in the mid-1930s) I'll never know? To employ a separate socket which only uses a diode doesn't make much sense. The use of a duo diode triode would not have increased the cost of the receiver by very much and the extra audio stage would have given a considerable boost to the set's performance. Perhaps the more up-market Airings were given an extra audio stage?

Checking it out

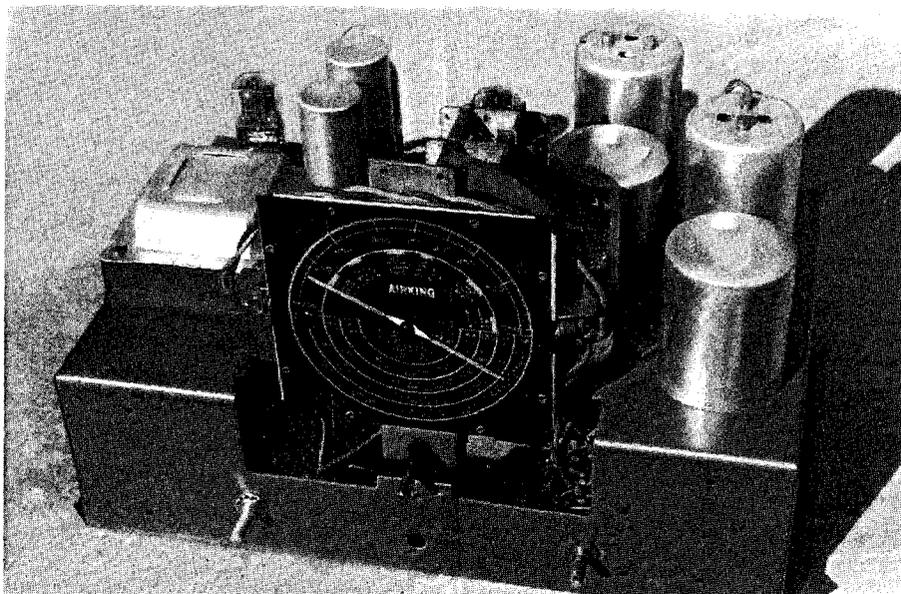
But let's not speculate on the whys and wherefores of the marketing approach for a 1937 radio receiver. Instead, let's get back to the repair itself.

As with any vintage radio repair, the set was thoroughly checked before any repairs were attempted. First, the primary and secondary windings of the power transformer were checked with an ohmmeter and were found to be intact. A high voltage leakage test was then conducted using a 500V megohmmeter and this showed that the insulation was also OK.

Similarly, continuity checks on the aerial, oscillator and shortwave coils indicated that they were all in working order, as were the 465kHz IF transformers. So far, things were looking good!

The next item to be inspected was the loudspeaker. The torn paper cone wasn't too bad and continuity checks confirmed that the field coil and the output transformer were both intact.

According to the owner, the set had always been stored in the house and this has certainly contributed to its excellent condition. A receiver that has spent 20-30 years in a damp shed deteriorates badly and items such as



The old Airing cleaned up rather well, as this front view of the chassis shows. The three controls are for tuning, volume and frequency range.



A Jensen electrodynamic loudspeaker with a 3k Ω field coil is used in the Airing. Fortunately, both the field coil and the output transformer were in working order.

field coils and output transformers suffer accordingly.

New capacitors

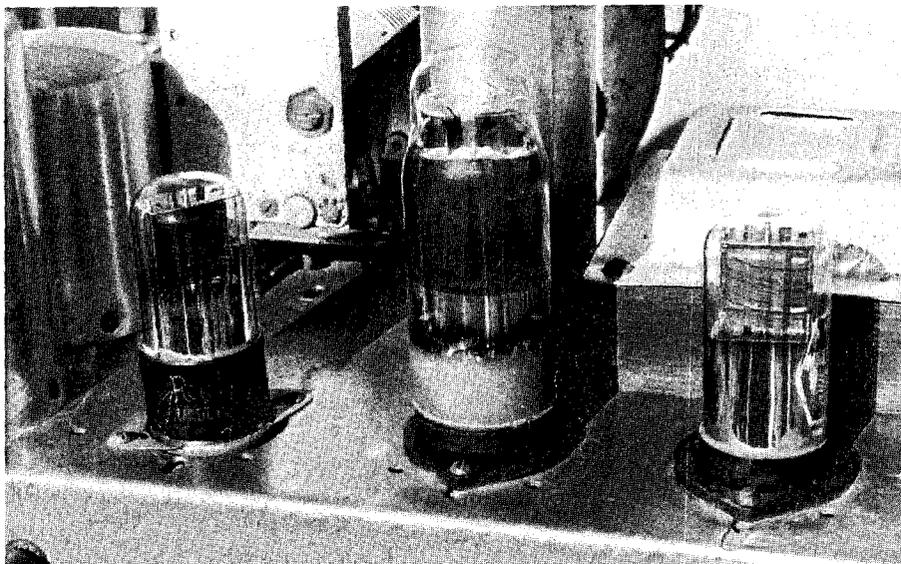
The set was still fitted with all its original "Channex" paper capacitors. As with any restoration of mine, they were discarded without a second thought and replaced with modern polyester types. Subsequent checks using a high-voltage megohmmeter revealed that many of the old capacitors were very leaky.

The original electrolytics had already been "replaced" but not in the

true sense of the word. Instead, someone had simply connected the new capacitors in parallel with the old electrolytics, a practice that should definitely be avoided.

My checks on the original capacitors showed that although they were defunct as far as capacitance was concerned, they were by no means open circuit. As a result, leaving them in circuit leads to unnecessary high tension leakage which, in turn, can overload other components.

My approach was to completely remove the old electrolytics from the



The EL3 output valve (centre) is flanked by a power rectifier on each side. The 6X5 (left) is actually used as a diode detector – a most unusual set up!

chassis. As a precaution, I also removed the replacement capacitors and installed two new $4.7\mu\text{F}$ 450V units.

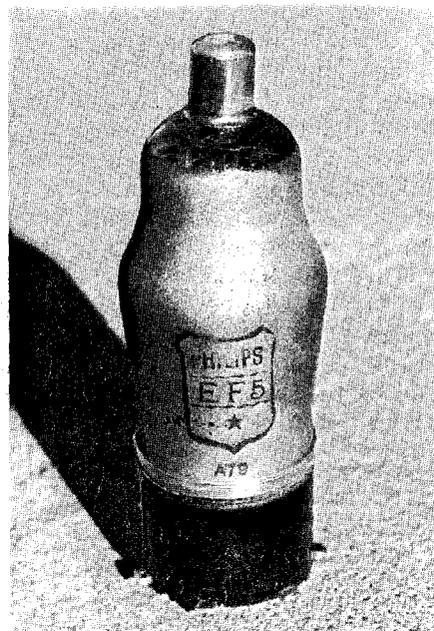
Ever since I added the megohmmeter to my range of test instruments, I make a point of disconnecting any mica capacitors (which usually don't cause much trouble) and subjecting them to a 1000V leakage test. If they pass the test, they go straight back into service. If they fail, they are replaced from my stock of spares. In this case, they all tested OK.

It didn't take long to sort out the speaker leads at the plug, as not all of the connections had come adrift. The speaker cone was repaired with Silastic[®] and while these cone patch-ups are not particularly neat looking, the result is quite an effective repair.

Several previously repaired speaker cones have now seen up to 10 years service and the silicone rubber compound is still flexible and is still adhering to the paper.

With the speaker repairs completed, a suitable dial pointer was scrounged from my junk box and while it may be slightly short, it certainly looks better than none at all. Another problem with the dial was that one of the dial lamps had burnt a hole through the celluloid dial face. This can be particularly annoying because the light shines through the hole and attracts attention to it.

Not having a spare Airking dial on hand I opted for the easy way out and blackened the dial lamp with a black Texta[®] pen. In addition, 150mA re-



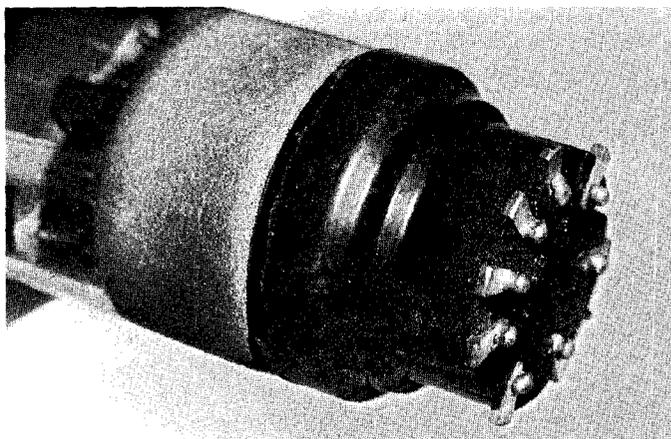
Repairs to the EF5 IF amplifier valve included re-attaching the top cap and reconnecting the metal spray shield to the cathode pin of the valve base.

placement lamps were substituted for the 300mA originals, as they operate at much lower temperatures.

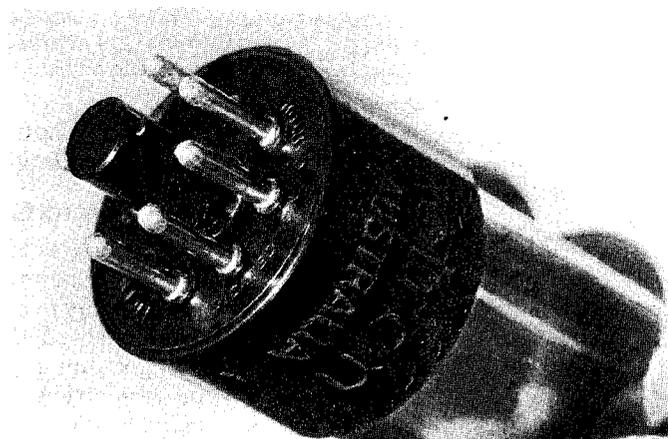
Valves checks

Neither of my valve testers can accommodate side contact valves so there was no way the valves could be tested other than by trying them in circuit. As luck would have it, all but one (an EK2) worked OK. Fortunately, a replacement valve was available from amongst my spares which saved having to do a socket changeover.

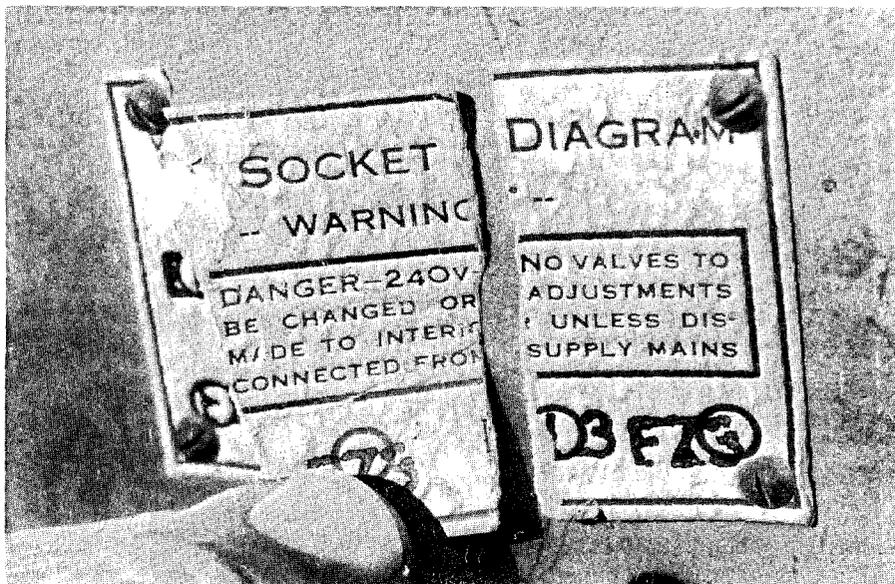
The EF5 IF amplifier valve required a few repairs, however. It had a loose



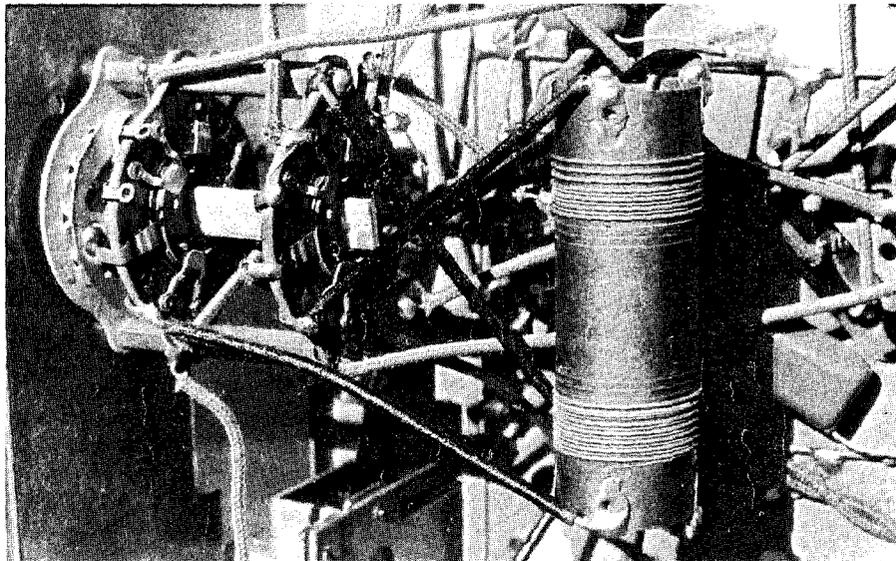
This close-up view clearly shows the side contact valve base. Once inserted into the socket, the valve can only be removed by pulling on the glass envelope and this often loosens the base.



The octal base with its keyed spigot is shown here. Octal valves give little trouble with socket connections but their big advantage is that they are more readily available than side contact types.



The missing section of the valve socket diagram solved the mystery of the unknown valve type. The receiver originally used an EZ3 power rectifier as a diode detector.



The Airking's two shortwave coils are wound on a common former. Because of the valve line-up, the shortwave reception is poor.

top cap and the wire that connects to the metal-spray shield had detached itself. The valve was repaired by resoldering the top cap and gluing it firmly to the glass (using Super Glue®). The shield was reconnected by binding the base of the metal-spray with fine fuse wire and soldering it to the cathode wire that protrudes from the top of the valve base.

As a matter of interest, the original valve types were as follows: EK2 frequency changer, EF5 IF amplifier, EZ3 detector, EL3 audio output and EZ3 power rectifier. Note that the detector provides no automatic gain control

function and that the volume control (a 3kΩ wirewound pot) is placed in the cathode circuit of the two radio frequency valves.

So it was all a relatively straightforward repair. The 5-valve cum 3-valve Airking works reasonably well on the broadcast band but shortwave reception is only mediocre. Considering the valve line-up, that's not surprising!

The logical thing to do would be to replace that 6X5 with a duo diode triode but as the repair had already gone over budget, the set was left as it was originally designed. **SC**