# VINTAGE RADIO

By JOHN HILL

# Getting out of trouble again

**Some time back I wrote an article about getting out of trouble. No it wasn't about some domestic problem or a brush with the law; it was about getting out of the sort of trouble that vintage radio restorers frequently run into. Repairing old radios is not always easy!**

The previous story was well received so I have decided to do another one along similar lines, but solving different problems. The first example is a good illustration of the troubles one can encounter when tinkering around with ancient radios.

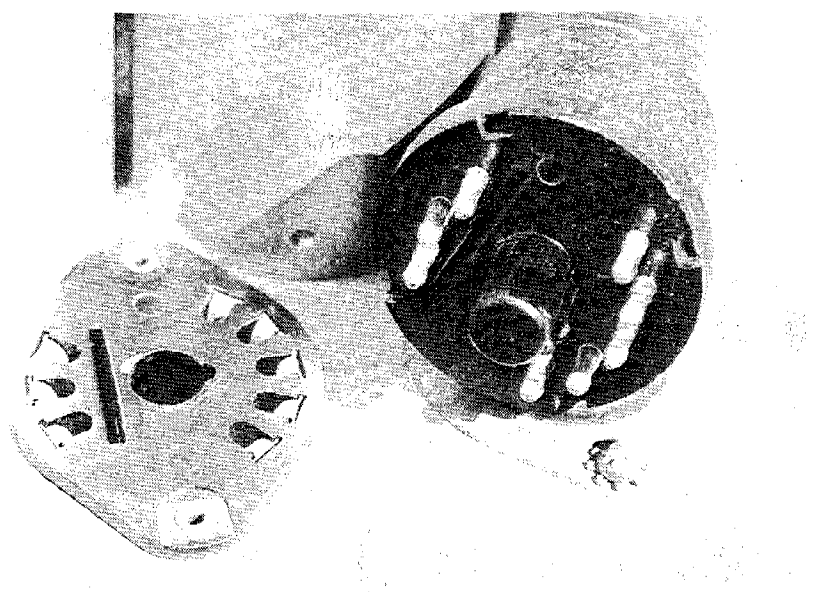
The receiver in this case was not mine. It belonged to a guy I know who runs an antique shop. He usually doesn't stock old radios in his shop because he claims that they are too troublesome, but he bought this particular set because he liked the look of it. In fact, he liked it so much that it went into his house and not the shop.

Both he and his wife enjoyed their old radio for a while, until it started to crackle and make strange noises. In due course, it ended up on my workbench for repair. The radio was a 5-valve German Saba, a large table model with a tuning indicator and a timber cabinet.

As is typical of some European sets, it required more than the usual time and effort before the chassis and loudspeaker were on the benchtop, ready to be worked on. And it was obvious from the start that the radio had been serviced on several previous occasions. The strange mixture of valves alone was enough to attract anyone's attention. There were two original metal valves, one miniature 7-pin valve and one octal valve.

In addition, the rectifier valve was missing and had been replaced by solid state diodes.

The loudspeaker and several other components were dated February, 1939. No doubt this particular radio had relayed the rantings and ravings of the Fuhrer himself to some German family during the war years.



German metal valves were nothing like their American counterparts. Finding replacements for these valves was a problem for servicemen over many years & led to many substitutions.

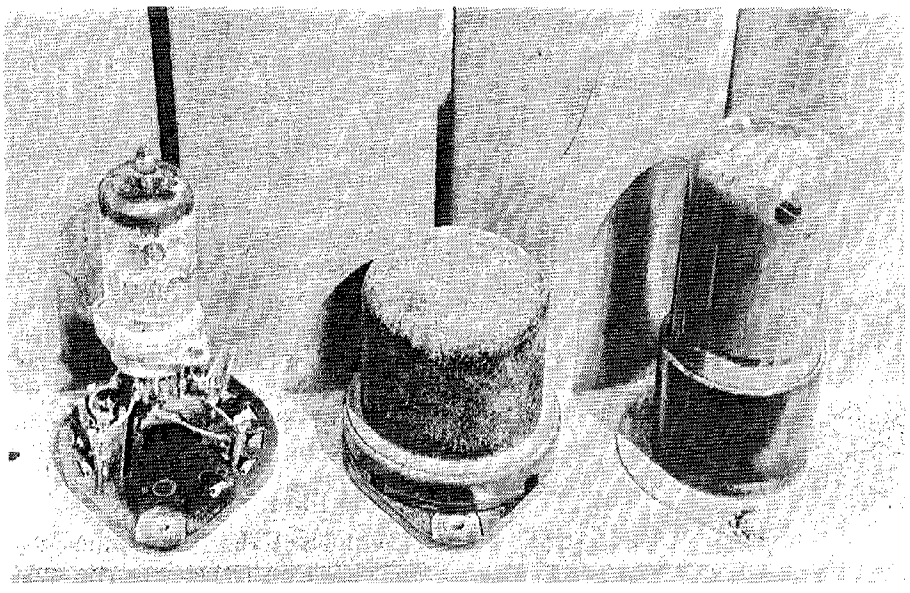
## German metal valves

The two original metal-cased valves in the receiver were an ECH11 and an EBF11. I twigged to the valve problem straight away because I had read about German metal valves only a few days before.

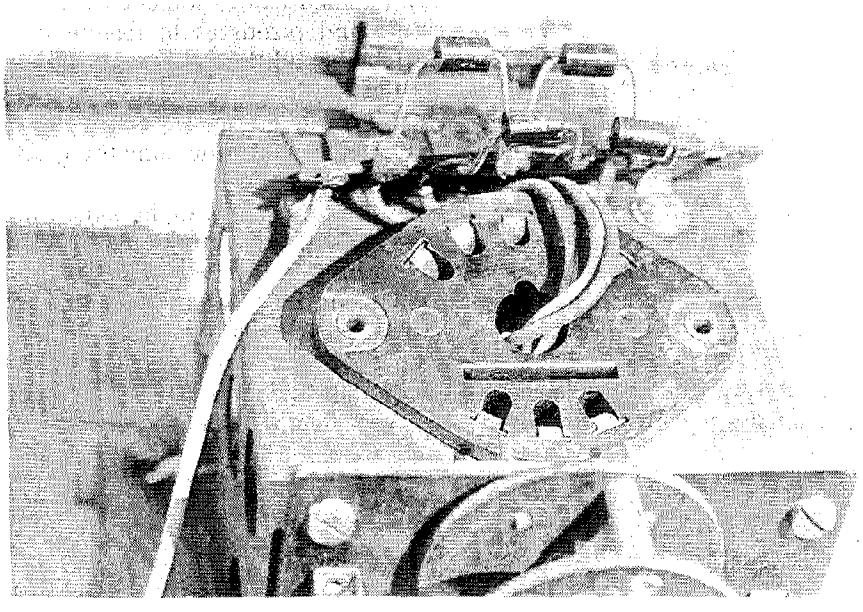
These valves were Germany's answer to the American octal metal valves. However, the valves were by no means interchangeable because the German 8-pin base configuration was nothing like the American octal configuration (see photograph).

The valve construction was different too. Instead of the valve elements being arranged vertically as was the established pattern of the times, the German metal valves were made with the electrodes running horizontally. While this made no difference to the operation of the valves, it made a big difference to their size and they were much larger in diameter than the American metal types.

Apparently, the German valves did not become popular (although Philips produced some) and the intervention of the war only made this situation worse. German metal valves, it seems,



**Only one of the these three valves in the old Saba is an original. At left is the substitute 7-pin IF amplifier, at centre the original EBF11 duo diode triode (AGC, detection & first audio), and at right the substitute 6V6 audio output valve.**



**The rectifier valve had been replaced with high voltage solid state power diodes. This is not the sort of thing a vintage radio restorer would do unless he had no alternative.**

were used mainly by the Germans.

As a result, the receiver on my workbench was a hard one to buy valves for. Now I'm not saying that they are unobtainable, but the chances of obtaining a set of these oddball valves would be pretty slim. They would be quite costly too!

## Interesting solutions

The interesting aspect of this set is the ways in which presumably different servicemen have overcome this valve replacement problem.

As previously stated, the rectifier replacement was easily solved by substituting solid state diodes. Some power diodes are rated at 400 or 1000 volts and these are suitable substitutes for a thermionic rectifier valve.

However, this modification will increase the high tension (HT) voltage significantly above that available from a normal rectifier valve setup. For this reason, the HT voltage should be checked and resistance added to the supply line, ideally between the rectifier and the first electrolytic, to restore a reasonable value. The actual value is best determined experimentally and a resistor rating of 5 watts will usually be necessary.

(Editorial note: the cathode/plate impedance of a vacuum rectifier, such as an 80 or 5Y3, is relatively high. At typical current drains (80-100mA), the DC voltage from the rectifier is approximately equal to the RMS supply voltage.

On the other hand, the loss across a silicon diode is of the order of only a volt or less, regardless of current drain. As a result, the voltage across the first filter capacitor can approach the peak value supply voltage or 1.4 times the RMS voltage).

The ECH11 frequency converter valve was still working OK, so this part of the receiver had not been altered. However, the intermediate frequency (IF) amplifying valve had most definitely been tampered with. As shown in the accompanying photograph, the original valve has been replaced with a 7-pin miniature type. This valve is mounted above the old socket, with leads running down through the old socket to the circuit underneath the chassis.

This conversion may look a bit makeshift but it is effective and the substitute valve can be replaced as easily as the original.

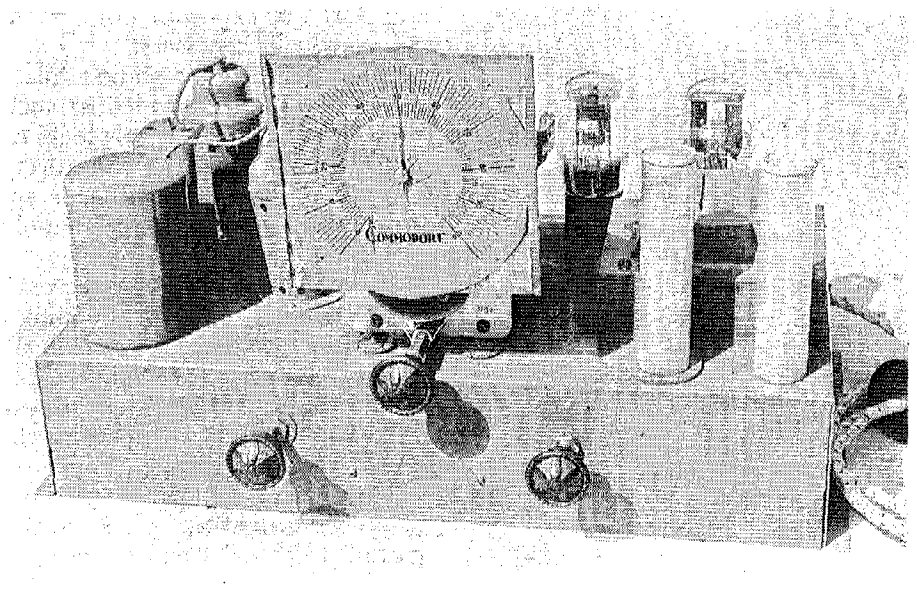
The next valve was the EBF11, a duo diode triode which handles the automatic gain control, detection and first audio functions. These operations were still being looked after by the original valve and again there were no modifications to this part of the circuit.

## 6V6 transplant

The final stage, the audio output, was another substitution job and it was done in a different manner to the IF valve and the power rectifier. In this case, the original valve socket had been replaced with a standard octal socket and a common and easily obtainable 6V6 valve installed in its place.

This 6V6 transplant is perhaps the neatest way to go about this type of modification. While the little IF valve mounted up on stilts works OK, it is not as neat a job as the output valve set up.

Likewise with the diodes soldered to the empty rectifier socket. Admittedly it is a satisfactory repair, but not the type of thing a vintage radio man would go for. An empty valve socket



**This particular receiver can be converted from 2.5V to 6.3V valve operation simply by plugging in the new valves & adding a 6.3V heater transformer. Not all sets can be converted this easily, however. It all depends on the original valve complement.**

looks as though something is missing. If a repair of this nature has to be done, then at least leave the old valve in its socket and install the diodes underneath the chassis where they are out of sight.

Naturally, the serviceman and the vintage radio restorer see things differently. The serviceman is only concerned with getting the receiver working again. The vintage radio enthusiast, on the other hand, not only wants it working but also wants the set to continue looking as it did before.

In the case of the old Saba with its oddball metal valves, originality cannot be easily achieved. Perhaps a conversion to octal valves would not be a bad modification in this instance. In fact, a set of octal metal valves would surely be a reasonable compromise.

But while it's easy to suggest altering the set to suit readily available valves, converting the receiver is a big job. Not only would the changeover be time consuming but it must also be done with considerable care.

First, the substitute valves will need to be fairly close equivalents to the originals. Second, each new socket must be fitted and rewired in accordance with the original socket connections. Any foul-ups here could be very difficult to locate later on.

So a job of this nature requires a systematic routine. As each socket connection is disconnected, the lead or leads should be taped together and labelled. Perhaps the serviceman's not so neat techniques are not so bad after all.

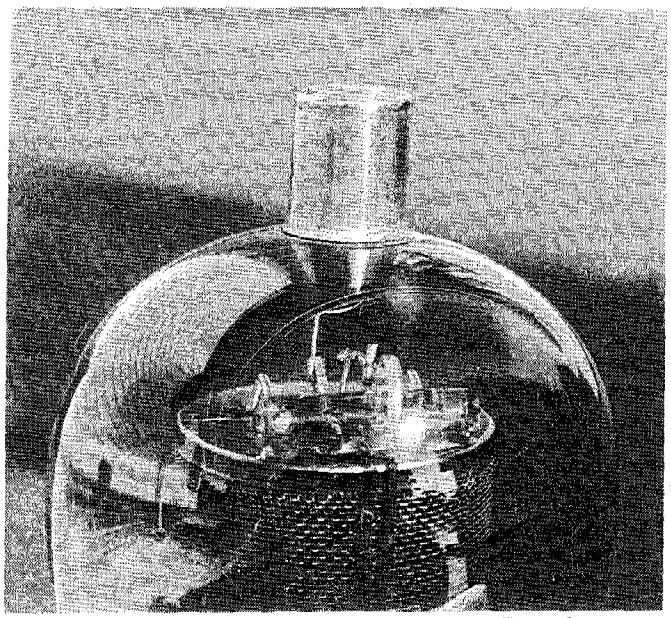
## Curing the problem

To finish off the story on the Saba, replacing a suspect electrolytic and a couple of sick looking paper capacitors solved the crackling problem. The set was then returned to its owner with the advice to sell it either to his worst enemy or to someone with the time and resources to restore it to original condition.

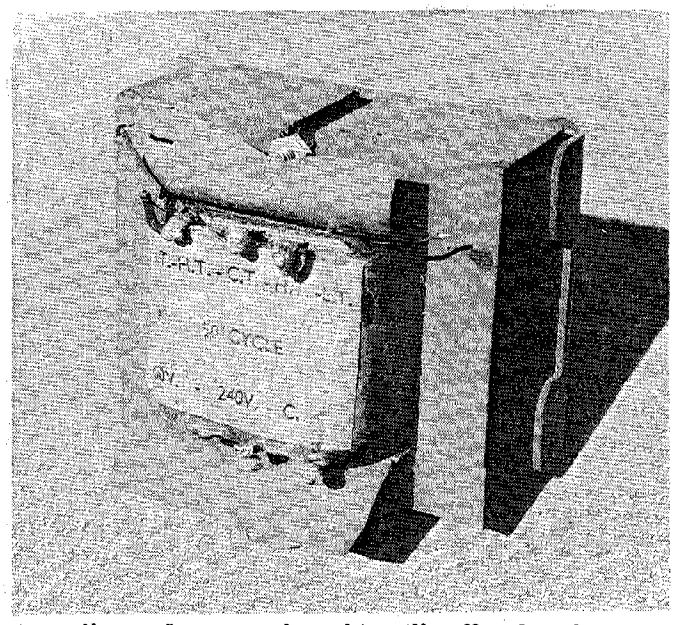
It's not that bad really, but the old Saba could be an awkward one to repair the next time something else goes wrong.

Continuing along in the same vein, any type of valve modification is OK if it allows a receiver to be repaired satisfactorily. If an obscure type of valve can be easily replaced with a more common type, it can save a lot of trouble and expense.

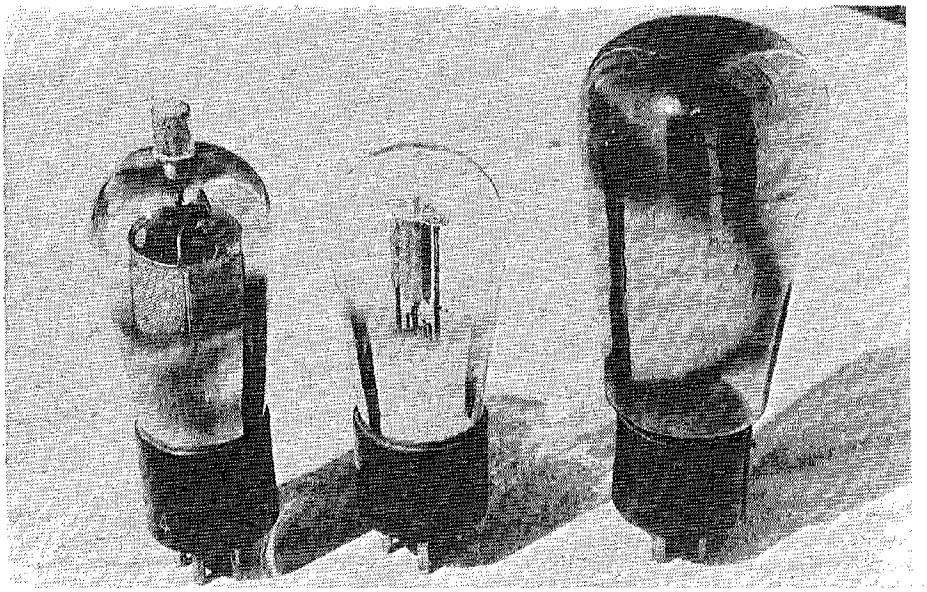
A receiver with hard-to-get 2.5 volt



**Many valuable old valves can be reclaimed by replacing missing top caps. This involves resoldering the top cap to the lead where it emerges from the glass & then securing the cap to the glass with a couple of drops of Superglue®.**




**A small transformer such as this will suffice for a heater transformer. In some sets, converting from 2.5 volt valves to 6.3 volt equivalents is one way of solving difficult valve problems.**



**Old 2.5V & 4V series valves such as these are often difficult to obtain and substituting other valve types is one way of getting a set going again.**

valves can be converted to early 6.3-volt valves without too many hassles due to the fact that the valve bases are the same. In favourable circumstances, all that is required is a 6.3 volt transformer for the valve heaters in place of the original 2.5 volt supply.

There is often plenty of room under the chassis to mount another transformer and special "heaters only" transformers for that specific purpose were made in the past.

In many cases, no other rewiring may be required. Many of the early 6.3 volt valves were direct equivalents to their 2.5 volt brethren, the heater voltage being the only difference.

In other cases, careful consideration must be given to the existing valve types and to those that will replace them. The job may not be as easy as first thought. For example, a 2.5 volt 59 output valve with its 7-pin base has no convenient 6.3 volt equivalent. On the other hand, a 2A5 can be replaced with a 42, the heater voltages being the only difference with these valves.

## Missing top caps

There is just enough space left for one more valve hint and it concerns valves with missing top caps. Usually another top cap can be soldered back on and a couple of drops of superglue will hold it firmly in place. But sometimes the grid wire breaks flush with the glass and there is nothing to solder to.

When this is the case, the glass can be nibbled away with a knife or some other suitable tool until it exposes a short length of the wire. With care, an extension can be soldered onto the stump and, in turn, soldered to the top cap. This process may be a bit fiddly but it effectively restores an otherwise useless valve to working order again. **SC**