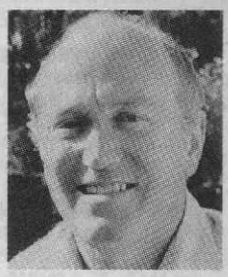
VINTAGE RADIO



By JOHN HILL

A couple of odd receiver repairs

I recently had two radio receivers to repair for a collector and, in each case, there were unusual problems. Both radios were small postwar 4-valve Bakelite cabinet types – one a Kriesler & the other a little Philips Philipsette.

Now some people make it difficult for repairers in that they tinker with things before they take it to someone to fix. I know this to be a fact for I have done so myself from time to time and I'm sure that I'm not the only one to do so. It is, therefore, only fair that someone has now done it to me.

In the case of the Kriesler radio, the owner had removed a component and lost it. What's more, this component was supposed to be a fairly mysterious one, being described as, "about so long, as thick as a finger, hollow and burnt black".

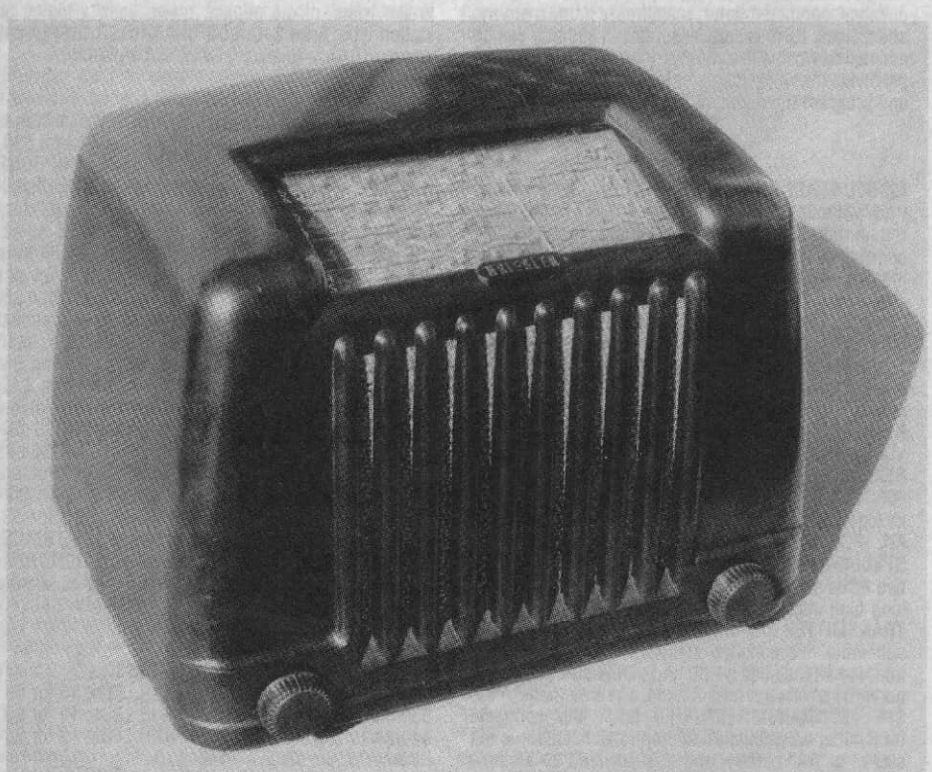
It was its blackened colour that prompted the owner to remove it because it must have been the problem. However, even when the charred part was removed, it was still unidentifiable and what to replace it with was a mystery. Whether it was a resistor, a capacitor or some other component neither he (nor I at that stage) had any idea.

There was one consolation, however. The position from which the strange component had been removed had been marked.

When I finally started working on the set, it was quite obvious what the missing part was. It was positioned between the two positive contacts of a twin high-voltage electrolytic capacitor and could only be a high tension filter resistor. Yet it was not the usual setup.

It would appear that the missing resistor was a high wattage wirewound type because all the current from the rectifier flowed through it before anything was connected to the high tension supply. By contrast, in most small 4-valve receivers, the high tension for the output valve comes from the input side of the filter and a one or two-watt carbon resistor is used in conjunction with a second electrolytic capacitor on the output side to supply the other valves.

The value of the missing resistor could only be guessed at. Something around 5kΩ and 10W was used as a starting point. Unfortunately, it did not bring the set back to life.



This photo shows the 4-valve Kriesler that had the missing component. It also had other problems – mainly faulty paper capacitors.

Voltage checks

As nothing seemed to be self-destructing, I did a few quick checks with the voltmeter. There was around 240V on the input side of the filter resistor but less than 100V on the output side. A 1kΩ resistor was substituted with very little difference in output voltage.

In this set, a 30kΩ resistor connected to the output side of the filter applies high tension to the screen grid of the IF amplifier valve. This screen resistor had about 100V on one side and

zero volts the other. Based on this evidence, it looked like the resistor was open circuit.

Wrong! – when the resistor was removed, it checked out well within tolerance and was replaced from whence it came.

So where to from here? This particular screen connection on the IF valve also applies voltage to the 6AN7 frequency converter valve via a connecting lead. When this lead was disconnected, the screen grid on the IF valve suddenly had voltage applied to it.

By this stage of the proceedings, the fault was fairly obvious – a short circuit at the point where the screen voltage of the IF valve is applied to the 6AN7 frequency converter socket. As the socket connection at that point had a 0.05µF bypass capacitor to chassis, it seemed likely that this component could be faulty – and it was.

After disconnecting the suspect capacitor (an original paper capacitor I might add), it was found to have a complete short circuit. Replacing this faulty capacitor restored the set to working order once again. But although the set was now working, the high tension voltage was still only 150V at the output side of the filter.

Capacitor checks

So far, only two components had been replaced: the filter resistor and the faulty screen bypass capacitor. All the remaining paper capacitors were originals and it seemed that they too could be a little suspect.

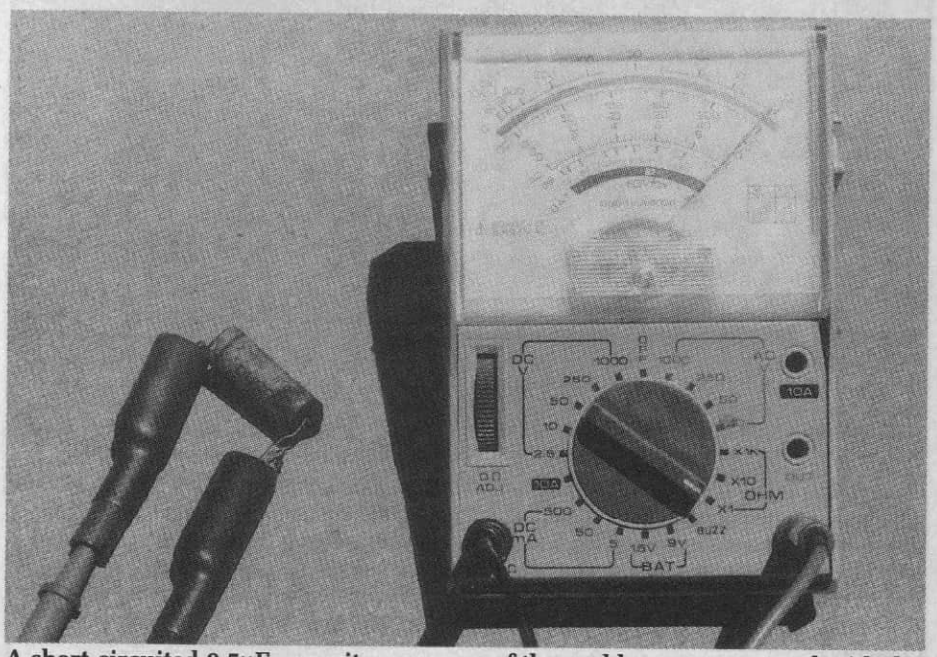
Checking the capacitors with a voltmeter revealed that three of them had high tension voltages across them and these were replaced with modern polyester equivalents. This step saw the high tension voltage rise to 210V.

The remaining paper capacitors were all replaced with 100V greencaps.

Looking back, I don't suppose there was anything really spectacular about this particular repair. It was fairly routine and systematic as it followed the trail from the missing resistor to the shorted paper capacitor, then onto the other leaky capacitors.

It does show, however, that one must look beyond the broken down component and locate the real cause of the problem. The real fault in the old Kriesler was four ailing capacitors, not the obvious overloaded resistor.

This small Philips 4-valve receiver is a mighty performer for its size. It had a number of problems, including a faulty valve, faulty capacitors & power transformer faults.



A short-circuited 0.5µF capacitor was one of the problems encountered with the Kriesler repair. The routine replacement of paper capacitors can automatically solve many obscure receiver faults.

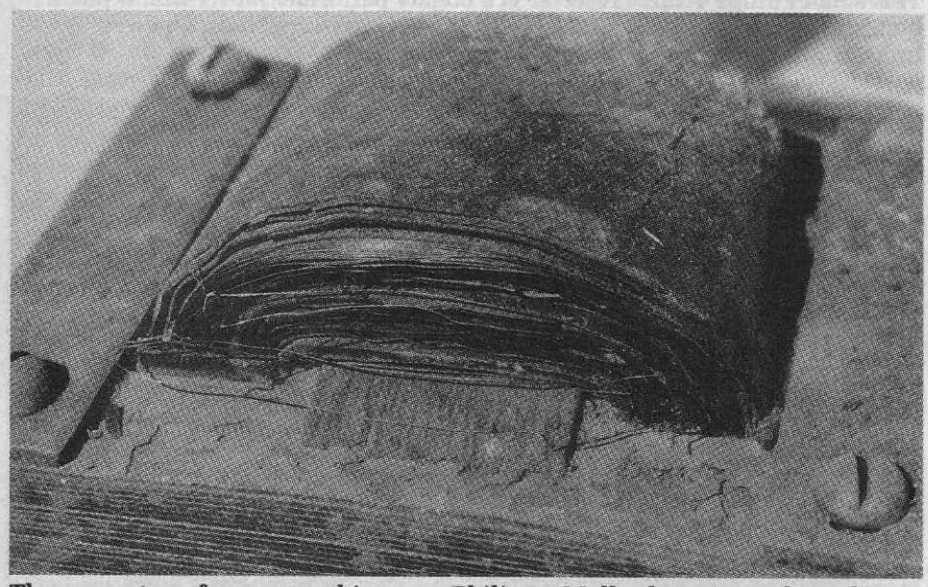
The final touch to the Kriesler repair was an alignment check. This was most essential as the adjustment slugs in the aerial and oscillator coils were many turns out, thus displacing the tuning to a considerable degree.

The Philips receiver

Next was the little Philipsette and what a great receiver they were for their size. This one looked a bit of a wreck though; it was very dirty and its control knobs were missing. These missing knobs looked like they could be a problem as they are special little red ones that are unique to this particular receiver. I was fairly sure that I had no spares.

My concern about the knobs was unfounded. On withdrawing the chas-

A completely dead ECH35 valve & a few sick capacitors were all that prevented the Philipsette from working.



The power transformers used in many Philips & Mullard receivers share this common fault – an exposed high tension winding. The winding protrudes outside the paper insulation that separates the layers (probably caused by the paper shrinking with age). This is not the transformer used in the Philipsette in the story but a similar one in worse condition, to show the problem more clearly.

sis from the cabinet, two red knobs fell to the floor. They had been loose inside, rolling around on top of the chassis. Why they hadn't been lost is a miracle.

Valve problem

The little Philips had a valve problem – the ECH35 frequency converter was very dead in the heater department and needed replacing. The remaining three valves tested OK.

Removing the dirt and grime from the chassis was next, then the valves were refitted for a quick try out. Within 15 seconds from switch on, the set burst into life.

But working and working well are two different things. The sound was harsh and distorted and it became worse as the volume was increased.

Like the previously mentioned Kriesler, the Philipsette had all of its original capacitors, both paper and electrolytic. The latter looked particularly bad, as the seals at the positive ends were ruptured and split. Despite their appearance, they seemed to be working OK but, of course, they were all replaced.

Replacing all the paper capacitors cured the distortion problem. The exact fault may have been a leaky coupling capacitor to the grid of the output valve. A leaky capacitor in this position is bound to cause distortion. The high tension voltage rose by about 20V after the capacitor replacement job was finished.

By the way, the term "high tension" is relative when referring to one of these little Philips receivers. The rectifier, a 6V6GT, operates with only about 110V on the plate compared to a typical plate voltage of 250V.

Alignment OK

These neat little radios are sods of things to align because all of the adjustments are made with those rotten-to-work-with Philips trimmer capacitors. You know the ones – those with the external coil of fine wire. As the alignment seemed to be very good, I chickened out and left it alone, declaring the repair finished.

Now both of these receiver jobs were done to a set price. If they had been mine I would have fitted a new dial cord, cleaned the back of the dial glass and maybe installed a new output transformer. But when working to a fixed price, such niceties have to be ignored. These extras take time and money and if a customer will not pay to have such things done, then he must live with the consequences.

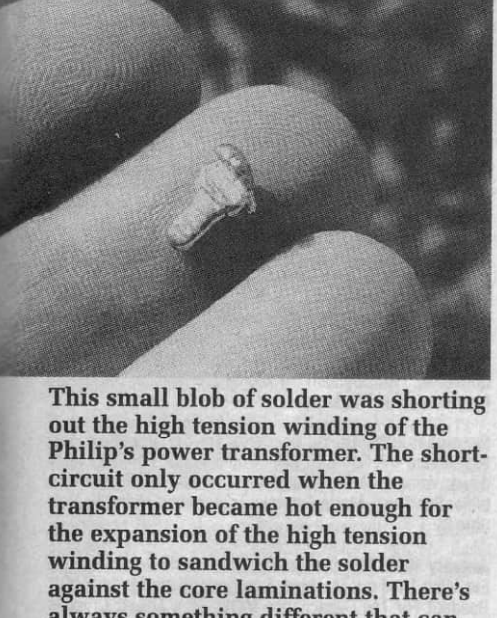
The Philipsette was working away on the bench while I was cleaning the dust out of the cabinet. Then, quite suddenly, the clear reception went soft and garbled. To make matters worse, the power transformer was rapidly overheating.

Faults such as this are annoying to say the least. One minute you have a receiver working normally; the next, there is something sadly amiss.

HT short

When a transformer suddenly overheats, it usually has a short circuit in or across one of its secondary windings. In this case, the valves and dial lamp were still lit, so it appeared as though there was a high tension short.

A careful examination was made of



This small blob of solder was shorting out the high tension winding of the Philip's power transformer. The short-circuit only occurred when the transformer became hot enough for the expansion of the high tension winding to sandwich the solder against the core laminations. There's always something different that can cause trouble.

all valve socket connections. In particular, I checked for loose wires, blobs of solder and broken insulation but everything checked out OK. Even withdrawing all the valves did not prevent the transformer from overheating.

It then occurred to me that if the short was still there when the rectifier was withdrawn, then the fault must be on the transformer side of the rectifier socket – perhaps in the transformer itself.

A close inspection of the power transformer revealed a blob of solder wedged firmly between one side of the high tension winding and the core laminations. A molten drop of solder could have only fallen in there when the chassis was upside down. As I had done my work with the chassis on its end, I didn't put it there!

Removing the solder returned the set to normal operation. The solder was acting like a thermal switch and only caused trouble when heat expansion of the windings caused the solder to short the HT winding to the laminations.

In addition, it was noticed that some of the high tension winding was exposed and a couple of turns were hanging out in the open. This is a common fault with this make of transformer because the windings come quite close to the edge of the paper that separates each layer. The loose wires were coaxed back in place and held in place with silicone sealant. **SC**