

FROM THE SERVICEMAN WHO TELLS

"WHAT WILL IT COST TO FIX IT?"

One of the awkward situations which most servicemen face is the problem of "quoting" for repairs. Members of the public often request this—some virtually demand it!—and it is almost impossible to explain just how difficult this can be. My first story this month typifies some of the problems one encounters in such cases.

SOME people hang on to old radio sets till they virtually crumble into the ground. Others seem to be fatalistically ready to "write them off" after a couple of service calls.

What prompts this remark was the man who dumped a mantel receiver into my shop the other day, with the request that I "look it over." With the air of a man in a hurry, he told me that he had had the set to a serviceman some months before, for repairs involving a couple of pounds. The serviceman had warned him at the time two or three valves were rather on the weak side and would, sooner or later, require replacement.

Now the set had "gone" again and he supposed that the valves in question were to blame. Perhaps it would be better to dump the set, instead of spending any more money on it, and buy a new one. He'd leave it to me to decide!

NOT THAT OLD

In fact, the set was a few years old but modern enough to have miniature valves and certainly modern enough in appearance. Provided there wasn't too much wrong inside, it was much too good a set to scrap.

But what would be wrong?

That's one of the nasty twists to radio servicing. It sounds so easy to the client to request a diagnosis, so he can make up his mind about having it repaired. But, as often as not, locating the fault is more than half the battle and accounts for a goodly proportion of the time involved.

What's more, it's a bit risky to assume that an inoperative receiver will be okay after you've fixed a particular fault. For all a serviceman knows, correcting one fault may merely reveal another.

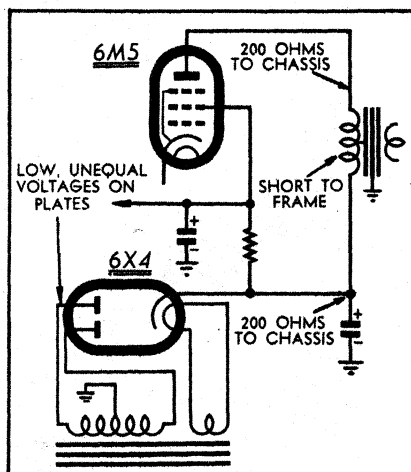
One useful point I was able to ascertain was that the set had apparently been going well enough till sometime during the previous day, when it had stopped suddenly. This seemed to indicate a straight-out failure which should yield to a straight-out repair. I could see little to justify the thought of having to write the set off.

When I switched the set on, a little later, I was greeted with a very solid hum from the loudspeaker but no sign of a signal. All the valves were alight but the hum suggested that the 6AV6 first audio or the 6M5 output valve might have developed an internal short. Plugging others in, however, made not the slightest difference. It wasn't going to be as simple as a faulty valve!

It took only a couple of minutes to

pull the knobs off and undo the screws holding the chassis in place. As I pulled the chassis out, however, there was an ominous tinkle from the far side and the dial glass fell in pieces on to the bench.

Just how this had happened, I cannot be quite sure. I feel reasonably certain that there was no obvious break in the glass when the owner delivered the set to me, otherwise he would most certainly have listed it as another possible



Relevant portion of the circuit in which the unusual fault occurred. Main feature of the fault was the rather misleading symptoms it produced. Repairs were relatively simple.

reason for "writing it off," while I would have noticed it during my preliminary appraisal of its condition.

I can only assume that the glass was already broken at one or more of its supporting corners, which were not readily visible, and that it was supported by a part of the cabinet while the chassis was firmly in place. As I withdrew the chassis the support was lost and the glass balanced in place only long enough to get clear of the cabinet and high enough above the bench to ensure that it readily broke when it fell.

But it was rotten luck. Most spare parts I carry in stock but not spare dial glasses. Whatever else might be wrong with the set, it would have to be held up until I could get a new glass—assuming that they were still available. If they weren't, I'd be in the nasty position of having to convince the owner that I wasn't really responsible and, in any case, of having to contrive a substitute.

However, that would have to wait. My immediate problem was to find out what was wrong with the set and, in particular, what could simultaneously stop it and cause a very heavy hum.

The next step was almost automatic . . . to switch the set on again and measure the volts on the high tension line. There were just enough volts to move the pointer off the stop on the 300 volt range, only about 10 volts, to be more specific.

This didn't check at all and I looked critically at my meter setting and leads to see whether I was misreading something, but everything seemed to be as it should. The simple point of the matter was that an ordinary power valve, with only 10 volts on the plate, should not be able to produce anything like the output that this one was, even if it was only hum.

AC ON THE PLATE?

The next step, also, was virtually automatic. Loud hums that go hand in hand with wrong voltages often mean a breakdown in the power transformer, somewhere, applying AC to the receiver's high tension line.

A voltage measurement on the two rectifier plates had an ominous look. They were both under the 200 volt mark, which seemed rather low to begin with but, more significantly, they were not equal.

Suddenly the future for the set didn't look so bright. It had a broken dial glass, which might or might not be replaceable, a power transformer that was now suspect, two or three valves that the previous serviceman had queried and, as a further result of the present failure, a couple of electrolytics that might have been wrecked.

But another step remained to be taken. I pulled the 6X4 rectifier out of its socket and measured the voltage once more on its plate pins. This time, they were noticeably higher and exactly equal. It didn't look like an internal short any more. It looked, rather, as if the DC

system was imposing a very heavy load on the transformer, so that the two halves of the secondary read differently, purely as a result of the natural difference in winding resistance.

Well then, let's check the high tension line. Switching the set off, I connected my ohmmeter from the high tension line to chassis. Result? A DC resistance of around 200 ohms.

How come? Could one of the electrolytics be faulty?

I disconnected first one, then the other. No result. The 200 ohms remained stolidly in circuit.

Perhaps the output valve socket had broken down, so I touched the meter prods between the 6M5 plate pin and chassis, to be rewarded with a faint yet familiar click from the speaker. The winding was obviously intact but the 200 odd ohms was still showing on the meter.

Clearly, I would have to conduct a lead-by-lead search for the explanation.

PICKED IT IN ONE

As it was, the very first lead I unsoldered removed the short . . . and it was the lead to the output valve and transformer. More unsoldering followed and there was no doubt about it; the resistance was between the output transformer primary winding and chassis.

And then the significance of the 200 ohms suddenly dawned. The winding had shorted to frame somewhere about the middle, possibly due to a turn having slipped out of position and touched the core. Since the winding apparently had an overall DC resistance of about 400 ohms, a short to chassis halfway would look like 200 ohms from either end. In other words, the 200 ohms I had measured between plate and chassis was not the same 200 ohms that I had measured between HT line and chassis, even though they were caused by the same fault.

And it didn't stop the winding from reading as "continuous" when metered from end to end and it let the meter produce its familiar click from the speaker cone.

No wonder the power transformer had been distressed, with its output being dissipated directly in a 200 ohm circuit!

No wonder the set had stopped dead, with no voltage reaching the output plate and only 10 volts on the high tension line!

No wonder the speaker had hummed, with the rectifier output being fed directly across half of its input transformer! (The set, by the way, happened to be one of those in which the output valve plate is fed directly from the first filter capacitor.)

And no wonder I was confused for a few minutes!

SIMPLE CURE

Having located the trouble, it didn't take long to install a replacement output transformer, not forgetting to phase the voice coil feedback. I connected the primary leads permanently but only tacked the secondary leads into place. At first switch on, the set howled, which pretty clearly indicated that the feedback was the wrong way round, being positive instead of negative. Changing the leads over stopped the howl and brought signals to light.

The hum level was quite low, indi-

cating that the filter capacitors were okay but a check on the 6X4 indicated that it hadn't exactly been improved by the experience. However, I decided not to change it, planning rather to warn the owner that it was "over the hill," though still operative.

As for the dial glass, I found that a new one was immediately available for a few shillings. Once again, I had reason to be thankful for firms which stand by the serviceman in the way of spare parts.

Strangely enough, the owner seemed quite relieved when I returned the set, along with a not-too-imposing service charge. Despite his off-handed manner, earlier, he probably would have begrudged the cost of a new set, had he really had to buy one