

VINTAGE RADIO

by Roger Johnson



The Year That Was: 1929

1929 really was a big year for change in the domestic radio — or 'wireless' as it was still called at the time. All-electric sets with balanced armature speakers meant better performing and better sounding radios, that were also cheaper to run. The first audio amplifiers for 'music reproduction' also began to appear.

ONE OF THE MOST surprising things to come from researching the literature for 1929 is that the triode was still very popular, if not dominant in both electric and battery sets. As seen in Fig.1, RCA's model 60 all-electric superhet consisted of a string of type 227's and the ever-present type 171A output valve.

A flick through a compilation of US circuits shows plenty of electric sets making use of the one and only screen-grid type 224 in TRFs and superhets. But in the few superhets that existed, a type 227 triode was invariably used as a separate oscillator, rather than the familiar 'autodyne' described in this column about 18 months ago.

Electric sets

"Just plug him into the light socket and hear him sing" was a familiar advertising line for 1929. But why the 'light socket', rather than a power point? This is interesting.

Reticulated electricity of different voltages and either AC or DC had been available to population centres in varying degrees from about the start of World War 1. If there was AC and DC mains available, the electric receivers could only be used where AC was available, because in the 1927 to 1933 period the radios were all designed with a mains transformer.

Most early domestic installations were to provide electricity for lighting only (Hence the expression "to pay the electric light bill"). About the only appliance available to a household was an electric stove. Many early stoves had a power outlet built in the switch panel, and this was often the only electric power socket for the whole house.

Glancing through the advertisements of the 1928/29 period would suggest that an electric fan, an iron and a radiator — apart from radios and gramophones — represented the sum total of electrical appliances! But there was no shortage of all-electric radio sets.

The ones that exist today, particularly the

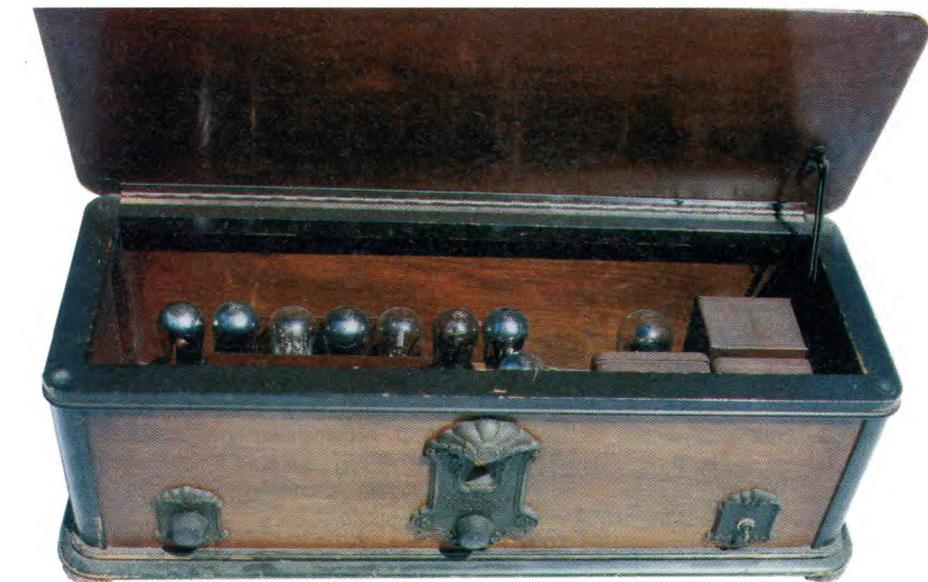


Fig.1: A classic 1929 'coffin box' set: The RCA model 60 superhet, which uses no less than eight triodes.

'brand names' all stemmed from this period. AWA Radiola had 'electric three' and 'electric seven' models, Atwater Kent the 'electric six' and 'electric seven' (probably models 36, 37, 40, 41, 42 and 52, with six valves; and models 38, 43 and 44, with seven valves). Stewart Warner and Stromberg Carlson had similar sets, King its models 'H' and 'J', Astor its 'all electric one control neutrodyne', Crosley its 'gembox', and RCA the models 17, 33 and 60 — the eight-valve superhet pictured in Fig.1.

All of these sets received heavy advertising in 1929, but came in at a healthy price tag. The RCA superhet was priced at £85 with speaker, while the remaining six- and seven-valve sets were all in the £45 to £55 price range. Stromberg Carlson, Colmovox and Salanola were locally made brands, and offered electric three valve sets from about £27/10/-.

Later in the year, the RCA model 44

appeared in the advertisements as being 'the only imported set in Australia with screen grid valves'. The valve used was the UY224, but the claim is somewhat erroneous. The Cossor 'Melody Maker' was after all an imported radio, albeit a battery powered kit set, which also used a screen grid valve.

Circuits

Apart from the superhet, as far as the six-triode TRF circuits go, if you've seen one you've seen 'em all! They were invariably an untuned RF followed by two tuned RF stages, detector, audio and output. Some had three tuned RF stages, requiring a four-gang tuning capacitor. The seven valve models just had an extra 171-A for push-pull output.

In the imported American sets, the valves were all type 226's except for the detector and output, which used a type 227 and 171-

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Fig.2: The AWA Radiola 'Electric 3', which required a separate heater winding on the transformer for each valve!

A respectively. Some did have type 227's in all sockets except the output.

The AWA Electric Three had four valves; type 227, 226, 112-A and 280 for the rectifier — which meant that the mains transformer had to have a separate winding for each valve! The circuit for this set is shown in Fig.2.

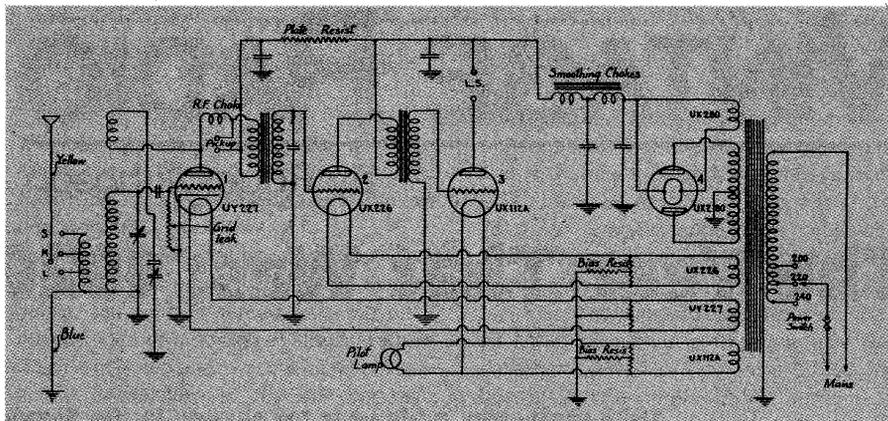
Astor's electric sets used British types, usually Osram MHL4 and P625, and Noyes Brothers department store in Sydney marketed a version of a Stromberg Carlson with their own brand name 'SEYON' (which was 'Noyes' spelt backwards), but which used four volt Philips types E415 in all sockets except the output, in which a C603 was used, and the rectifier where it had a Philips 4V type 1560.

The power supplies of these sets were invariably completely encased in a metal box which contained the power transformer, the filter chokes, and not uncommonly the 2uF paper filter capacitors as well. Then the whole was filled with pitch, with just a cable emerging from beneath. So repairing a power supply is not without its problems...

The rest of the power supply circuit was basically a wirewound voltage divider which supplied the back bias to the output valve as well as suitable voltages for the various stages. Cathode bias was obtained from the centre tap of the 1.5V winding for the type 226's, and that was it. The remainder of the circuit was transformer coupled, using either RF or audio transformers. The only other 'component' was a block of bypass capacitors.

Screen grid valves

Previously we've noted that 1928 introduced the screen grid valve. We can safely say that 1929 consolidated it. Initially, the screen grid circuits were battery circuits, and one, perhaps two were used as RF amplifiers ahead of the detector. Where one stage of



screen grid RF was used, the detector was invariably regenerative.

However, the 'Standard AC 4' described by the late Ross Hull in *Wireless Weekly* for 19th July 1929 uses two Philips type E442 RF stages, a Philips E424 detector and an output valve — "a variety of which may be chosen as discussed in the text". This circuit is quite a departure from the norm, as can be seen in Fig.3.

The grid circuit of V1 is untuned. Then follows two stages of tuned plate-tuned grid circuitry (otherwise known as 'bandpass' tuning), requiring a four-gang capacitor. In the circuit, this whopper is C8-C9-C10-C11. Four tuned stages appeared not to be enough, though, because regeneration is thrown in for good measure! (T2-C12)

Notice also the provision of an output transformer. This is designated a 'Ferranti OP 1', a particularly good choice; in fact it was the best available. This transformer had a primary - secondary ratio of 1:1, and they were priced at 41/-.

There are two reasons for the output transformer. Firstly, even a modest output valve such as a C603 or 171-A is still going to draw something like 20mA of plate current, which is far far too much for a horn speaker, in case anyone was unwise enough to consider using one. (10mA is as much as anyone should consider poking through a horn speaker.)

However the second and more important

reason is that a transformer was vital for the operation of balanced armature speakers. This is despite the fact that they have an input impedance compatible with that of a triode output valve. The windings in a balanced armature speaker are wound in such a way that no matter how they are connected, one or other of the magnet poles will be demagnetised by the passage of DC flowing to the plate of the valve.

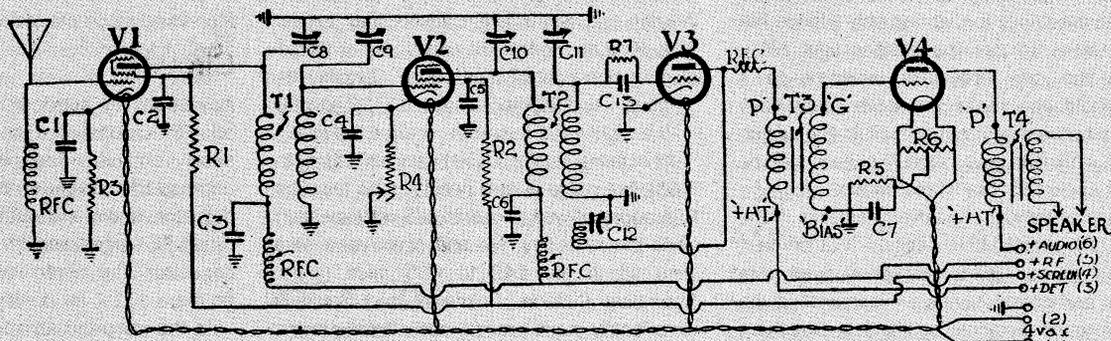
The Standard AC 4 would have been a very selective set and probably could have done without regeneration. Two stages of bandpass tuning is rather unwise unless exceptional care is taken with the coils. The amount of coupling is critical. Too much and it would oscillate uncontrollably.

The coils specified were commercially wound, and no instructions were given for winding your own. They were arranged in such a way that they were wound on separate formers, and for each T1 and T2, the formers were placed one atop the other, but with the right hand edge of one in line with the left hand edge of the other. In other words, they were offset by the diameter of the formers. This was done to reduce the amount of coupling, and each stage was extensively shielded by aluminium compartments.

Battery eliminators

Even if the radio consumer was reluctant to purchase a new all-electric set (remembering

Fig.3: The Standard AC 4, described in *Wireless Weekly* for 19 July 1929.



that they cost from £30 for a simple set to £60 for something decent), there was no shortage of battery eliminators on the market and they were heavily advertised.

Most vintage radio enthusiasts are probably familiar with the Philips varieties. These must have been well made, for they are the most numerous to have survived. In conjunction with the B eliminators was the 'trickle charger', which kept the filament accumulator up to the mark, and saved someone their fortnightly trip to the motor garage to have it re-charged.

Philips were by no means the only ones available, but they are the ones that seemed to have survived. 'Balkite', 'Pilot' and 'Emmco' are three of the other popular brands.

The idea was to literally run your battery set from the electric mains. Thus the battery all-triode 'coffin box' radio of the 1923 to 1928 period could now be entirely operated from the electric mains.

John Murray Moyle

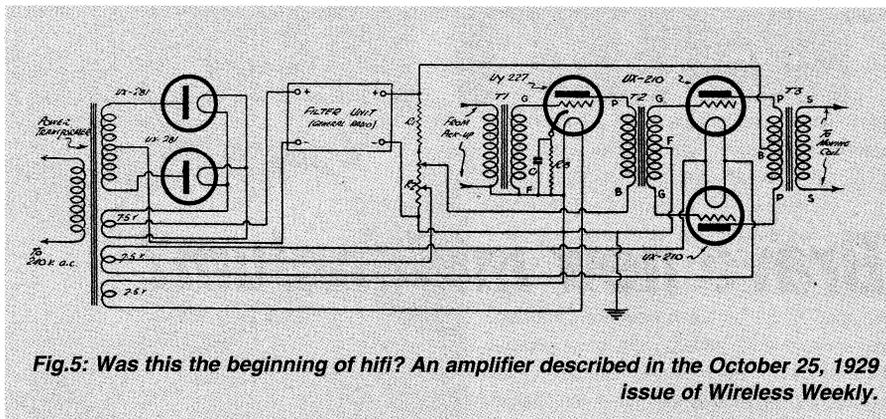
The name John Moyle is familiar to many enthusiasts, being the first technical editor of this journal's predecessor, *Radio and Hobbies*. His life and contribution has been most eloquently discussed by the late Neville Williams in his column 'When I Think Back', in *EA* for September and October 1989. For those fortunate enough to have copies of *Wireless Weekly*, his name appears there as well.

Where then, would you expect to see his early work? It is not in *Wireless Weekly*, but instead the Melbourne based rival magazine, *The Listener In*. Readers will recall that he was born and educated in Melbourne.

Unfortunately, the author does not possess a complete set of *The Listener In* (who does?), but the circuit shown in Fig.4 must surely be one of his earliest efforts, in the issue for October 23, 1929. As he was born in 1908, he would have been only 21 years of age when describing this circuit.

By the way, this circuit contains a fairly obvious drawing mistake. Can anyone spot it? (Hint: the detector grid would be very positive if wired as drawn.)

Answer: There is a small value (250pF)



capacitor missing from the connection from the anode of the RF stage to the tap on the detector grid coil. (Just in case anyone is in doubt, the capacitor is quite clearly shown in the wiring diagram. It's also mentioned in the caption to the circuit.)

Dawn of 'hifi'?

Because of the newly released electrodynamic speaker, which one could argue revolutionised radio, there developed new circuits to drive them. The free-standing 'audio amplifier' was released, both in ready made varieties and also in the form of descriptions in the popular magazines for home constructors.

The famous Loftin-White direct coupled amplifier has already been described by my forerunner with this column, Peter Lankshear. However, an amplifier claiming impressive results for 'the reproduction of music' was described in *Wireless Weekly* for 25th October 1929.

The circuit is shown in Fig.4. It holds no surprises, and the quality would depend largely upon the choice of transformer. The Ferranti units are recommended, together with a Magnavox moving coil speaker. This setup would probably be about as good as one could get for the home constructor, and probably on a par with the best of the commercial brands.

Along with ready-made amplifiers, which were not cheap, were a variety of magnetic

pickups. These pickup heads had a tracking pressure similar to, if not heavier than a purely acoustic head. Some of them reached four ounces (100 grams!), and a steel needle had to be replaced each time a record was played.

R/C coupling

In closing our curtain on 1929, mention must be made of R/C coupling, which was emerging as an alternative to transformer coupling in the audio stages.

Some circuits described individual components such as '1/4 meg' (i.e., 250kΩ) plate load resistors, and so on, but there were also available curious little devices called 'resistance coupling units' which contained an anode load resistor, a coupling capacitor and a grid leak resistor all wired and assembled — with four connecting terminals P, B, G and F, corresponding exactly with the terminals on an audio transformer. Just to make things easier!

Yes, 1929 was a big year in radio, only to be marred by the onset of the Great Depression. ♦

