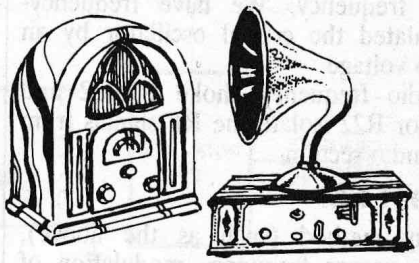
Vintage Radio

by PETER LANKSHEAR



The 'Hikers' – my first radio

About 50 years ago, as a pre teenager, I built my first radio, thereby infecting myself terminally with the radio bug. This humble little effort was one of the literally thousands of 'Hikers' series of sets, constructed by young enthusiasts of the period.

Kitset and homebuilt radio construction was very popular during the 1930's. One reason was economic necessity – a decent sized receiver was priced at a level equivalent to a colour TV set today, and incomes were relatively much lower. A small boy had little chance of owning a 'real' radio.

As a personal example, the weekly wage for delivering newspapers, involving a 10-mile bike ride starting at 4.30 each morning, was 11 shillings ($1.10). At the time this was about the price of one valve.

Fifty years ago, radio held for technically minded hobbyists a fascination much like computers have today. Little wonder then, that magazines such as the *Wireless Weekly* carried a steady flow of constructional articles – including for the young fry, crystal sets and small battery powered regenerative receivers. Today a complete superheterodyne receiver can be purchased for the equivalent of the 1939 price for a single valve, and there is little incentive for youthful enthusiasts to make their own.

No equivalent today

Semiconductor technology has no real equivalent to the regenerative grid leak detector. Using fewer than a dozen components, a well designed one-valve regenerative receiver could, when connected to a decent sized aerial and in the absence of strong local transmissions, provide night time headphone reception from much of Australasia and even beyond.

Hobby magazines featured every conceivable circuit for these radios, each one claimed to have some particular virtue such as ease of tuning, extra selectivity or sensitivity. However even these simple receivers presented a problem for a lad with limited pocket money. The high tension supply generally required a 45 volt battery, costing around 20/– or $2, a sizeable amount for a youngster to accumulate.

The solution

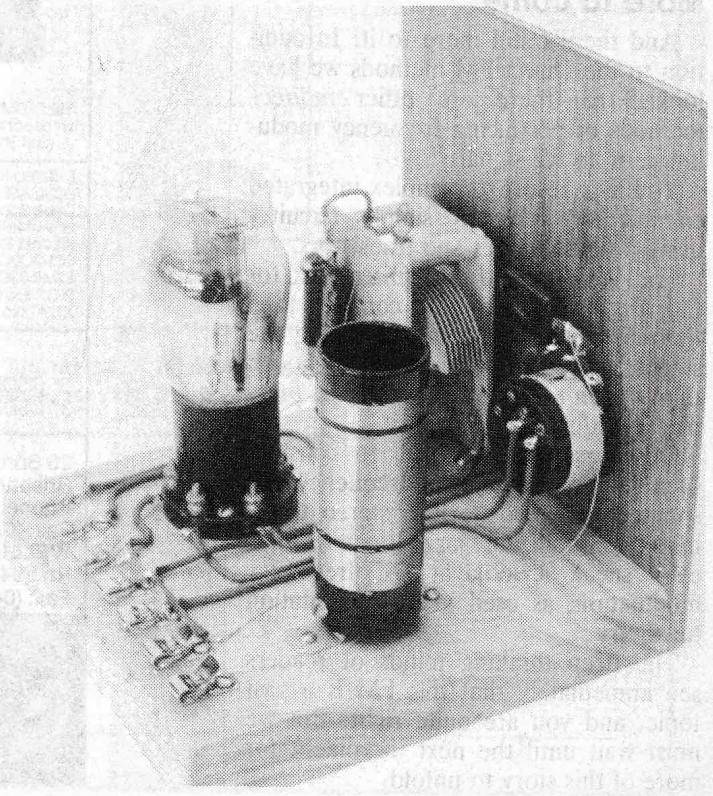
The American *Popular Mechanics* magazine featured hobbyist radio circuits each month. Around 1936, it described a one valve radio called the 'Hikers One' which needed only 6 volts high tension, achieved by operating the valve in the *space charge* mode.

Space charge operation had been investigated a decade earlier and found to have some interesting characteristics. A valve with two grids was connected so that the inner grid was operated at a few volts positive, whilst the outer grid was used as the control grid. The positively charged inner grid attracted copious quantities of electrons, many of them returning to the battery as a grid current flow. However, some 'overshot' and formed a cloud or *space charge* around the inner grid.

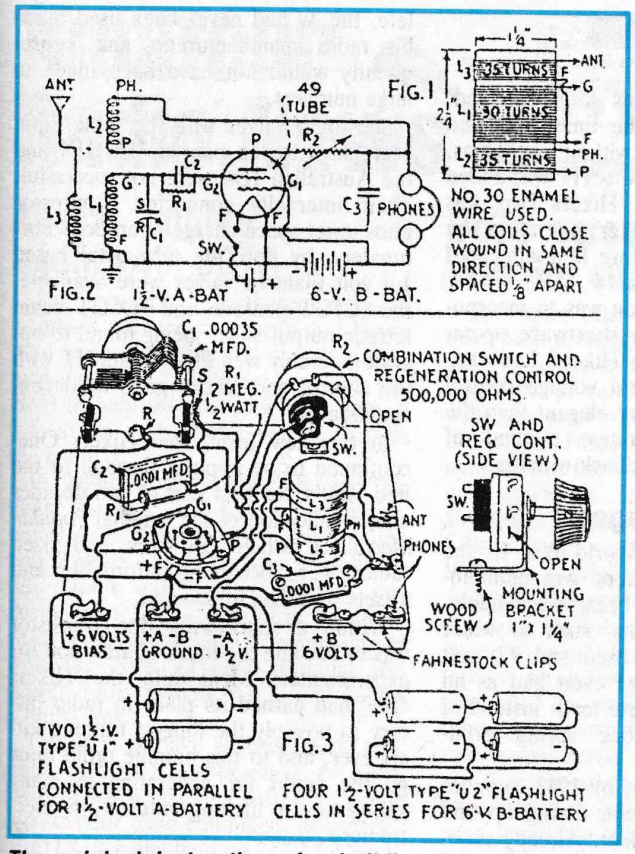
These electrons acted as a source of anode current, to be controlled in the conventional manner by the outer grid. The space charge in effect, formed a large diameter cathode, creating a valve with high performance at quite low plate voltages.

Original investigations concentrated on power amplifiers, but it was found that although respectable anode currents could be achieved, the total power handled by the valve was still quite small and the idea languished.

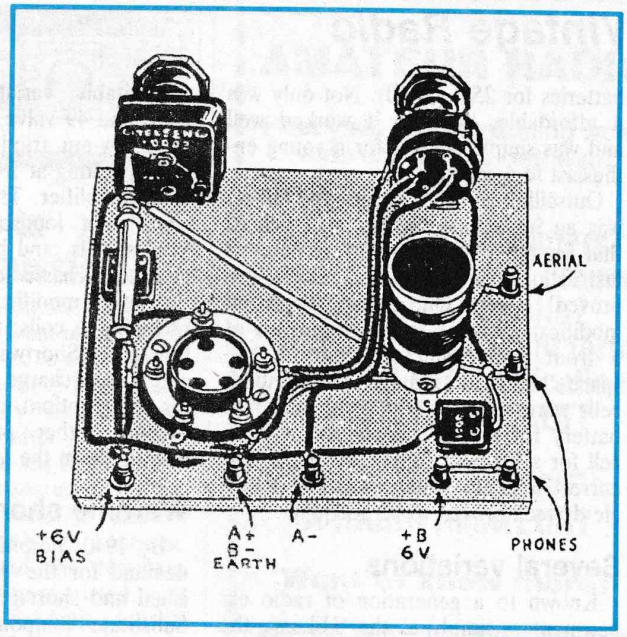
In 1933, two unique dual grid valves



The 'official' construction of the Improved Hikers One. The two control knobs and headphone terminals were on the front panel, with a row of Fahnstock spring terminals at the rear for all other connections.



The original instructions for building the Hikers One, from a 1936 edition of the US magazine 'Popular Mechanics'.



Constructional details of the first kit version produced by Lamphouse, the NZ kit supplier.

intended for the newly-popular class B audio amplifier service appeared on the American scene. These were the mains operated 46 and the battery version, type 49. Although with two grids, they were intended to be operated as triodes. With the outer grid connected to the plate, these valves became low impedance, low-mu drivers. Connecting the grids together produced a high mu-triode suitable for zero bias class B output stages.

Although the 46 and 49 were used to a limited extent in large receivers, they were never very popular, one reason being the requirement for a total of three valves for an output stage and driver. Radio hams used the 46 for modulator service, but the 49 was largely ignored.

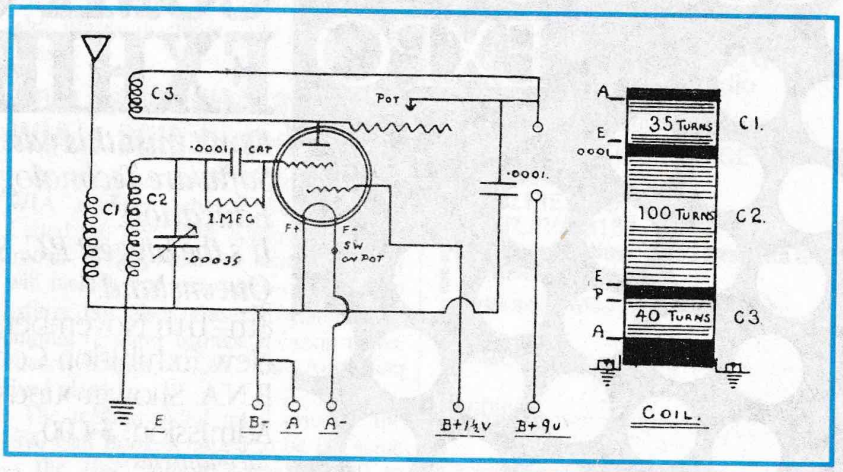
Someone in the *Popular Mechanics* team apparently realised that the structure of the 49 made it suitable for use as a space charge valve, and used it in a compact little breadboard constructed 'Hikers One'. This was a simple one-valve regenerative receiver using only four AA cells for a high tension supply, and two torch cells to light the filament. Useful as a radio for back-packers it might have been, but the real attraction for many was the inexpensive high tension supply.

Electric Lamphouse

Fifty years ago, 11 Manners Street, Wellington, could be likened to a mediaeval Dick Smith Electronics. In a long narrow shop in the heart of the city, the front of the 'Lamphouse' store lived up to its name by featuring an impressive display of lamps. At the rear a wide range of electrical and radio components was sold, with a very successful mail order service centred round their annual catalog.

More than a price list, the *Lamphouse Annual* included a mine of information about many aspects of radio and gave instructions for building their many kit-set radios, a large proportion being *Wireless Weekly* designs.

The *Lamphouse Annual* for 1937 included, without acknowledgement, the *Popular Mechanics* article on the 'Hikers One', and offered the parts less



The circuit of the Improved Hikers. The 'pot' was an inexpensive regeneration control and on/off switch. The use of regeneration gave sensitivity and selectivity out of all proportion to the small number of parts used.

batteries for 25/– ($2.50). Not only was it affordable, but also it worked well and was simple enough for a young enthusiast to assemble.

Outselling all other kitsets, the Hikers was an immediate success, so much so that for the 1938 *Annual*, very detailed instructions were written about an 'Improved' Hikers One. Most significant modifications were the incorporation of a front panel, and reduction of the space charge grid voltage. Untidy torch cells were replaced by a 9-volt grid bias battery for the 'B' supply and a No.6 cell for a filament supply. Although the correct filament voltage was 2.0, a single dry cell proved to be adequate.

Several variations

Known to a generation of radio experimenters simply as the 'Hikers', the new version was an unqualified success. Kitsets were sold in their thousands throughout New Zealand and in Australia. Unusually for a one-valve radio, independent firms sold Hikers fully assembled, often in plywood cabinets. Many more, including mine, were built up from scrounged and salvaged parts.

Inevitably, variations soon emerged. A second 49 valve, this time connected as a low-mu triode without grid bias, and operating at 18 volts HT was added as an amplifier. This 'Hikers Two' was capable of loudspeaker operation on local signals, and before long appeared in a metal chassis form.

Another modification was to incorporate plug-in coils, for shortwave operation. The 'Shortwave Hikers' had variable space charge grid voltage control for regeneration, more elegant than the original rather primitive method of loading down the feedback winding.

Wartime shortages

By 1940, despite World War II, the demand for the 'Hikers' was undiminished and shortages became inevitable. Substitute components, such as wafer valve sockets, were used and 9.0 volt batteries at one stage even had as an austerity measure, wire leads instead of the original 'Fahnstock' spring terminals.

Most serious of all, by 1943, supplies of type 49 valves were drying up and there was no equivalent. Already obsolete, the 49 had never been used much by radio manufacturers, and consequently would not have been made in large numbers.

Substitute valves with the same 5-pin base, such as the pentode 33, 1F4 and the Australian 1D4 were not successful. Their internally connected suppressor grids upset space charge operation. Fortunately, by now the new octal based 1.4 volt filament valves were available, the 1C5GT pentode and 1Q5GT beam tetrode output valves being found to operate tolerably well at 9.0 volts HT with the control and screen grids used conventionally.

In this new form, the 'Hikers One' continued to be popular through to the mid 1950's, the best part of two decades after publication of the original *Popular Mechanics* article. By now, full sized radios were becoming affordable and kitsets were less in demand.

Within a short while the transistor was to become the focus of attention for experimenters. Meanwhile, the 'Hikers One' had earned its place in radio history as possibly the longest running kitset ever, and to this humble radio must go the credit for generating in many youngsters a lifelong interest in electronics. EA

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