



AWA Newsletter

#79

August 2012

A Member
of the
SARL



Antique
Wireless Association
of Southern Africa

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AWA Committee:

- * President—Richard ZS6TF
- * Technical Advisor—Rad ZS6RAD
- * Secretary/PRO—
Andy ZS6ADY
- * Western Cape—John ZS1WJ

Reflections:

Last month I bragged about having the privilege of going away on our annual pilgrimage and this month I have been paying dearly for it.

I must apologise to all the readers for having taken so long to complete the August edition. It's almost time for the September issue.

However, be that as it may, we will eventually catch up and I am sure most of you will understand.

It was really a good break, the mobile rig worked well and I even had the chance to visit Om Chum and his wife in Sedgfield and have a cup of coffee and a good eyeball QSO.

Travelling around the country, one always has

the opportunity to meet new people on air and you are really a captive audience for most as you are trapped in your cocoon. Several new contacts were made.

The wonder of amateur radio still came to the fore as I was able to call in to the net on Saturday morning and of course was able to be heard without too much problem.

I still amazed at how well the AWA net is doing as every Saturday we get an average of 15 to 20 call signs as people from all over the country call in. There is still a large following of people interested in the restoration and use of yesterdays radios and associated equipment it seems.

With that in mind, and as the summer rapidly ap-

proaches, the workshop may just be a good place to be found, working on that long awaited restoration job you (and I) have been waiting to get finished.

I know I have more than enough to keep me busy for the rest of the summer, so I am going to set some targets and get stuck in. That is of course if I can remember how to get those projects back together again that I have stripped in to pieces.

It remains to be seen how far I can get with it, but I am certainly going to make a go of it.

In between, I will be pounding the keyboard trying to get the newsletters out on time.

Best 73
DE Andy ZS6ADY

WIKIPEDIA

Electronic Packaging:

Many different methods of connecting components have been used over the years. For instance, early electronics often used point to point wiring with components attached to wooden breadboards to construct circuits. Cordwood construction and wire wraps were other methods used. Most modern day electronics now use printed circuit boards made of materials such as FR4, or the cheaper (and less hard-wearing) Synthetic Resin Bonded Paper (SRBP, also known as Paxoline/Paxolin (trade marks) and FR2) - characterised by its light yellow-to-brown colour. Health and environmental concerns associated with electronics assembly have gained increased attention in recent years, especially for products destined to the European Union, with its Restriction of Hazardous Substances Directive (RoHS) and Waste Electrical and Electronic Equipment Directive (WEEE), which went into force in July 2006.

CW Net:

Finally, and after what has seemed like an eternity, I am back on the CW net again.

With a modified ancient keyer that had a wooden paddle sticking out the front of it, I have managed to connect up the Bencher into it and have the KWM2-A back up and running on 40m.

It was so good to join in the net on two occasions already, but I also discovered how quickly one loses the touch of sending CW. Mistakes are a plenty, but thanks to the encouragement of Barrie ZS6AJY, we stick it out.

My plan was to join the CW contest on Sunday 26th, but of course those plans fell through quickly when unexpected visitors turned up. I cannot say that I was not relieved because the thought of taking part in a CW contest always gets me a little

short of breath as I can't seem to get my head around the protocol quick enough.

I still would encourage those of you considering putting your fists to the paddle, key or whatever it is you use, to do so. The sooner the better. I understand fully the hesitation that one feels in actually getting down and doing it, but it really is worth it in the long run.

There is such a wealth of information available for teaching aids on the internet, that there is really no more excuse for one to sit down and play out that fantasy of becoming a CW operator.

For those interested in doing QRP, the QRP net still runs in the weekday mornings on 3579 and then there is the AWA CW net on Saturday afternoons at 14:00 on 7020. Not many around, but there is



nearly always one or two stations listening on 7020, waiting for someone to call CQ.

So get it going, warm up the fingers, stretch the joints, tickle the paddle and join us on one of the nets.

We always work at a speed that is comfortable for you, except of course if you're too fast for me.

SSB activity:

Band conditions in general, have been fairly good. 40m has been a most surprising band to work on right throughout the winter period and has proved itself to be pretty consistent.

Most times, it really has not been necessary to use the 80m relay, but we do continue to run it on most of the Saturday nets. It would be nice to know if there are any who listen to the relay on 80m.

With 40m in the condition it is in and the solar flares continuing the way they are, it looks like 40m will still be the band of choice for a long time to come. At least that is the way it looks at the moment, but of course we know it can change at any time.

The net seems to be fairly stable on a Saturday morning with an average of 15-20 stations calling in. On the odd occasion we have reached the top end of the 20's, which is quite exciting to hear all the different rigs being used on the net.

It's also great to hear of all the work that is being done in various areas where a lot of restoration is taking place.

There some real Guru's out there doing fabulous work on restoring the radios that we all love and cherish so much, and it would be great to hear from you all of the projects on the go. Come up on the SSB net and tell us what you're busy with.

Ask any questions you may have about restoring or technical questions. We have some Guru's who will be able to help with any problems you may be having.



Hallicrafters HT37

AM:

The AM net continues to be fairly well attended on a Saturday morning. Most Saturdays there are at least 4-5 on frequency, with some Saturday's, between 7 and 8.

The interest in AM has never really been that great, but there is always someone there to fly the flag.

The Wednesday evening nets are very sparsely attended. Most times there are no more than 2 stations on frequency with the odd occasion, a few more coming up.

Be that as it may, AM is still a great way to play real radio. There is no plug and play here. One has to understand the basics of tuning up a rig, even a transistorised rig, because if you don't get it right, the damage

is normally terminal.

Of course, the valve rigs are still the best for playing AM because that is what they were made for.

Valves are very forgiving when it comes to things like SWR, power output etc. They can also be most spectacular when something really does go wrong.

Whatever your choice, AM really sounds good, you get to hear the real voice of the transmitting station and sounds just rally come alive.

If I have managed to convince you to try out turning that mode switch on your rig to find out what AM is all about, do come up and

join us. Of course you are going to have to set your alarm for a Saturday morning, which most are not used to, and then you going to have to brave the cool start to the morning. But let me promise you, it is well worth it.

Try it, you'll see.



Hallicrafters SX28

Classical Receiver Circuits

Part 2: Grid Leak and Regenerative Detectors

By Marc F. Ellis, N9EWJ
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During most of the 1920s, the radio most likely to be found in the family living room was a battery powered vacuum tube set. And virtually every one of these radios used a grid-leak detector. Regenerative detectors, to be considered separately later on in this article, also work on the grid-leak principle. To many hobbyists, the working of this widely-used circuit and the meaning of its colorful name remains a mystery. We'll try to throw some light on it here.

For a review of what a detector must accomplish in a radio receiver, review the discussion of the detection process in "Crystal Detectors" (Part 1 of this series, in the previous issue). Now we'll take a look at how the grid-leak detector does this job. Refer to the vintage receiver circuit of Figure 1. When no signal is present on the grid of the tube, a steady stream of electrons (which are negatively charged particles) is emitted by the filament. That electron stream flows, unimpeded, past the grid and is attracted to the positively charged plate (it is a basic law of physics that there is an attraction between oppositely-charged bodies and a repulsion between bodies of the same charge).

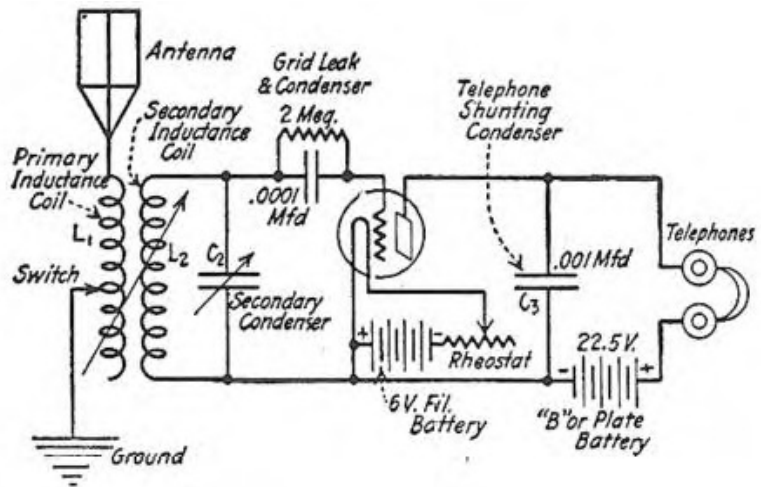
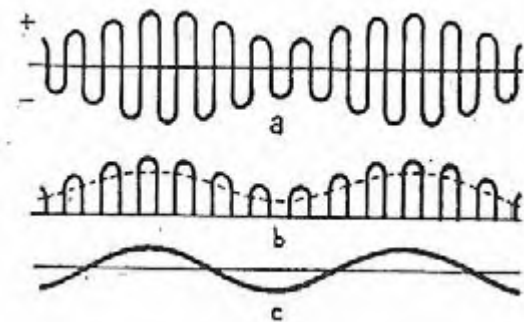


Fig. 1. Vintage schematic diagram of a simple grid-leak detector circuit.



From Part 1: Figures 1a, 1b and 1c.

tube because that has a negative charge and also repulses them. Hence they are trapped on the right plate of the grid leak capacitor. When the signal becomes positive again, more electrons pile up—and are trapped on—the right plate of the grid leak capacitor.

RECTIFICATION AND FILTERING

If the grid-leak resistor were not present, the number of "trapped" electrons would continue to build up, giving the grid a strong enough negative charge to repel all of the electrons being emitted by the filament. With no electrons reaching the plate, the tube would stop functioning. However, the excess electrons slowly "leak" through the grid leak resistor and, passing through the "Secondary Inductance Coil," return to the positive side of the filament circuit.

The current passing through the grid resistor moves in one direction only: from grid to filament. It is direct current, and constitutes the "rectified" or "detected" radio signal. The strength of this current at any given time represents the strength of the original radio wave as modulated by the audio signal being carried. If it were not for the grid capacitor and "Telephone Shunting Condenser," the current would still have the high frequency oscillations of the radio carrier superimposed on it as in Part 1, Figure 1 b. However, these capacitors tend to filter out the oscillations (see explanation in Part 1), so the signal looks like Part 1, Figure 1 c and is a reproduction of the original audiosignal used to modulate the carrier. Besides separating the audio signal from the radio frequency carrier, the tube also functions as an audio amplifier. The small current variations in the grid circuit control the much larger current flowing through the earphones in the plate circuit, causing that current to vary in a matching pattern. The result is a much stronger audio signal, giving comfortable headphone volume.

REGENERATION

Many sets of the 1920s were *regenerative*. The regenerative design, invented by the legendary radio genius Edwin Armstrong, squeezed an amazing amount of performance out of a single tube. The secret lay in the fact that some of the signal coming out of

Now let's see what happens when a modulated radio signal (see Figure 1a of Part 1, which is repeated in this article) is picked up by the receiver. The signal appears across the tuning capacitor (labeled "Secondary Condenser" on the schematic). Note that the upper end of the capacitor is connected to the grid of the tube via the paralleled grid leak resistor and capacitor (labeled "grid leak & condenser").

TRAPPING THE ELECTRONS

As you know from Part 1, the radio signal becomes alternately positive and negative over time. When the upper end of the tuning capacitor is positive, the electrons emitted by the filament are attracted to it and flow towards it. Of course they are prevented from reaching that point of the circuit by the insulating material between the plates of the grid capacitor. (The grid leak resistor has a very high value—on the order of a few million ohms, so the electrons cannot readily flow through it.) When the upper end of the tuning capacitor becomes negative, the electrons that had previous been attracted toward it are now repulsed. But they can't re-enter the electron stream flowing in the

the detector tube was fed back into it. This feedback arrangement meant that the radio signal was amplified over and over again, resulting in tremendous gain.

The schematic diagram of a simple regenerative receiver is shown as Figure 2. An arrow joining a set of coils means that the coils can be adjusted so that they are closer together or farther apart. The circuit looks very similar to that of Figure 1 except for an additional coil: the *Tickler Coil*.

Energy from the output (plate circuit) of the tube flows through it and, when this coil is close to the *Secondary Inductance Coil*, the energy is fed back to the tube's input (grid circuit). The closer the coils, the greater the feedback. To obtain maximum efficiency, the amount of feedback had to be carefully regulated. In the design shown here, this was accomplished by adjusting the relative position of the "Tickler" and "Secondary Inductance" coils. With the coils too close together, there would be too much feedback. The tube would then go into oscillation, emitting a radio signal that would interfere with reception throughout the neighborhood. But with feedback set just short of this point, the radio would deliver its maximum sensitivity.

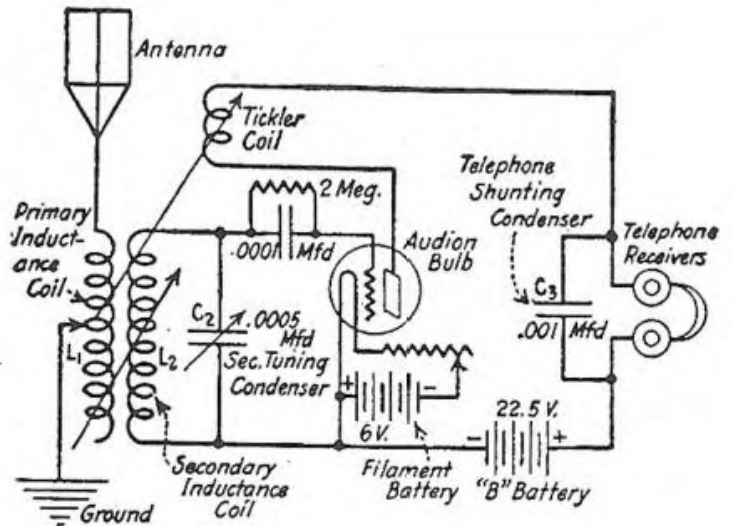


Fig. 2. Tickler coil initiates regeneration by feeding part of the signal at the plate of the tube back into the grid.

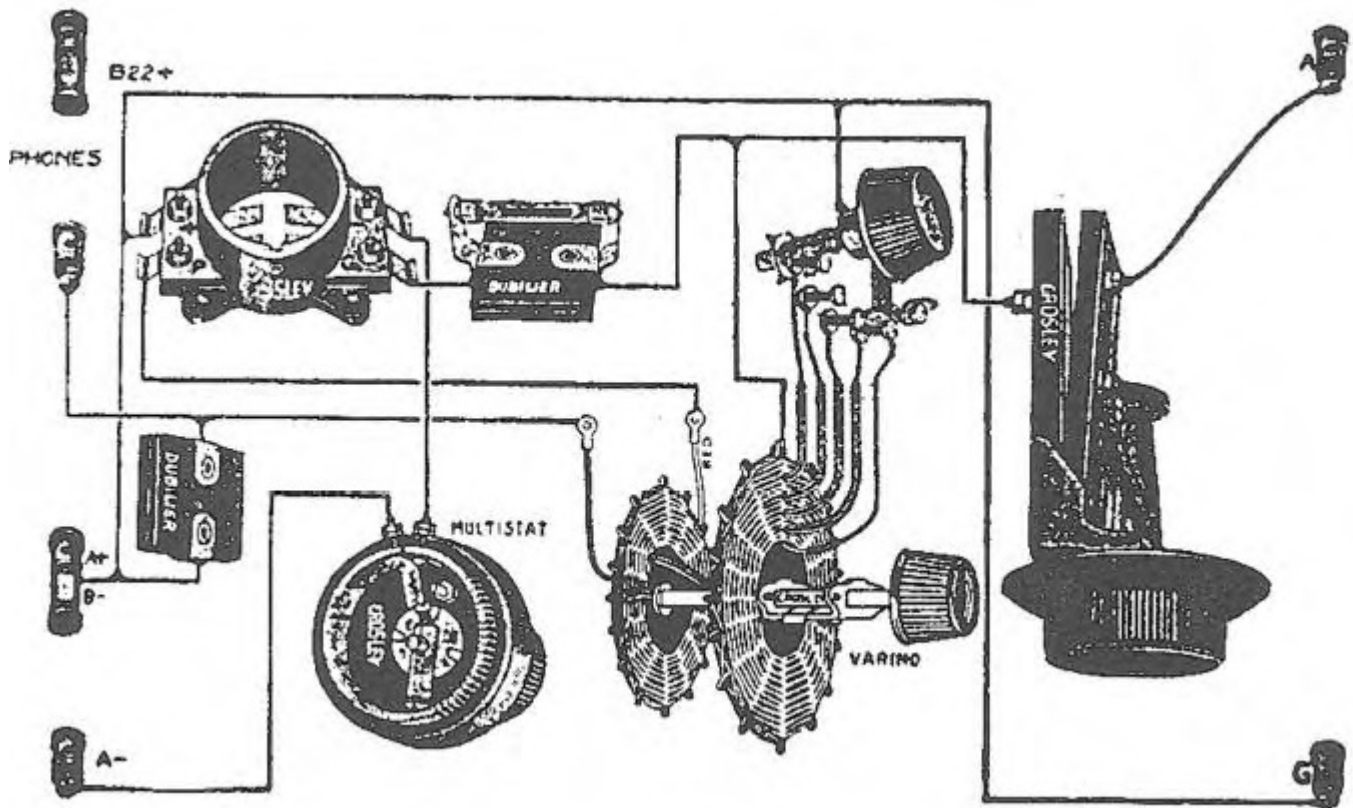


Fig. 3. Pictorial diagram of a Crosley 50 grid leak/regen set shows mechanical and electrical construction.

Figure 3 is a pictorial drawing of the circuitry of a Crosley one-tube regenerative set (the Type V, later marketed—substantially unchanged—as the Model 50). Notice the pair of basketweave coils just to the right of the "multistat" (filament control rheostat). The right-hand coil, with all the taps, is the tuning coil. The smaller coil at left is the "tickler." Moving the control knob in or out changes the position of the coils with respect to each other. The tuning capacitor (extreme right) is known as a "book" type; its capacitance is changed by moving the "leaves" (which are hinged at one end) closer together or farther apart. With regeneration properly adjusted, the feedback loop results in a several thousand fold amplification of the radio frequency signal prior to detection by the grid leak circuit. So now our single tube is performing three functions: detector, AF amplifier and RF amplifier.

President's Corner by ZS6TF

Bletchley Park part 2 by Richard ZS6TF

While awaiting some work to be done on the Landrover in Luton on Monday 31st July, I used the courtesy car to revisit Bletchley park once more as my ticket from August 2011 was still valid for free entry for a year. The Radio Society of Great Britain's National Radio Centre (NRC) had been officially opened just 20 days previously by the Hon Ed Vaizey, Minister for Culture, Communications and the Creative Industries at the UK Department of Culture, Media and Sport.

It was closed on the day I was there but I saw a movement inside and I was kindly let in by custodian Carlos Eavis G0AKI who was in the NRC doing a bit of admin and waiting for BT to connect the phone lines. He kindly showed me around and as one of the 3 trustees and creators of the centre, I got the inside story. There was very little old equipment on display as most of it had been dispersed to worthy museums. A representative home-brew radio from the 1930's, a Labgear LG300 transmitter, an HW101, and a rare KW2000B with digital display (one of 3 in the world) are on display.

The Centre is advertised as a world-class showcase for radio communications technology, bringing it to life by providing the opportunity to get 'up close and personal' with the history and technology of radio communications.



After a welcoming and informative film on the pervasive nature of radio in modern life, a wall of history takes the visitor from the first inventors in the late 19th century through Marconi, the world wars, to future radio developments, interspersed with examples of radio equipment across the 20th century.

Next are innovative interactive displays and hands on experiments demonstrating the functions of the building blocks of radio technology. Opposite is a wall-long display with video commentary showing how the electromagnetic spectrum from DC to light is used today. An opportunity to 'go on the air' follows on using a state of the art amateur radio station GB3RS.



The station features a Yaesu FT9000DX interfaced with a huge LCD screen, and the controller of the steppIR antenna installed on the roof of the NRC.

At the end of my visit Carlos took me "behind the scenes" to show me some treasures in the store like a KWM1 and a home-made transceiver from the 1920's which will go on display shortly when he has time to prepare them..

A part of the Bletchley Park Heritage site, the RSGB NRC, with its focus on radio communications today, fits naturally with other parts of the Bletchley Park museum, which demonstrates how radio communications have played a pivotal part in the history of codebreaking, counter-intelligence and national defence. I visited the Churchill collection which was closed on my last visit and re-visited the national computer museum and the Colossus machine again. Throughout the visit I noted the large number of exhibits that had been upgraded and I believe serious funding has been obtained at last from the UK lotteries to preserve and develop the site. The radio huts containing wartime and clandestine radios were unfortunately closed so I will just have to make another visit next year.

CONTACT US:

P.O. Box 12320
Benoryn
1504

Fax: 27 86 620 3291
Mobile: 082 448 4368
Email: andyzs6ady@vodamail.co.za

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**Antique Wireless Association
of Southern Africa**

Mission Statement

Our aim is to facilitate, generate and maintain an interest in the location, acquisition, repair and use of yester-days radio's and associated equipment. To encourage all like minded amateurs to do the same thus ensuring the maintenance and preservation of our amateur heritage.

Membership of this group is free and by association.

Notices:**NET TIMES AND FREQUENCIES:**

The following are times and frequencies for the AWA nets:

AM Net—Wednesday evenings from around 19:00:

Saturday mornings from around 06:00 or when band conditions allow. Frequency—3615.

SSB Net—Western Cape net Saturday morning from 07:30. Frequency 3612

National net Saturday mornings from 08:30. Frequency —7070 with a relay on 3615

CW Net—Saturday afternoon from 14:00. Frequency—7020.

(Times given are CAT or SAST)
