can be added later on. The three valves would probably give the main Australian stations on the speaker.

L. D. (Te Awamutu): My set howled loudly when tuned to a station, and when the volume was tuned, passed beyond a certain point.

A.: This is a case for a serviceman. It is probably a defective bias resistance in one of the radio stages. This might be a soft detector valve or a defective screen grid valve. These things can be determined only by testing.

2. When the pickup is attached it will not bring out the high notes of the record.

A.: This is due to the design of your set, and it can be overcome only by a special transformer used with the pickup.

3. How could I improve the selectivity of my set?

A.: Use a wave trap as is described in the R.R. this week.

CURIOUS (Timaru): Is a driving rod of a cone speaker made of brass or steel?—Usually brass.

2. How many turns for a 20 Henry choke?

A.: On a ½in. square core, 10,000 turns, a gap of .03in., and 36 gauge wire.

3. Why must I have a laminated core?

A.: Undesirable magnetic effects are set up when the core is solid. These are reduced to a minimum by the use of a laminated core.

4. My aluminium panel is corroded—what can it be coated with to prevent this?

A.: Clean it with Brasso.

5. What gauge wire is used in loudspeaker coils?—40.

VALVES (Whangarei): What valves would give the best results in an American five-valve neutrodyne?

A.: Four 221's or, failing these, 201A's, and a medium power valve.

G. T. (Ngaio): Would a 66 R. unit or an inductor dynamic speaker be the better with the L.W.?—The latter.

2. Which is, in your opinion, the better of the two inductor dynamic speakers I mention?

A.: We do not know anything about them, having tested only the Farrand.

3. Is the Loftin Three selective?—No.

4. Can a 30 Henry choke be used for the output instead of a 1-1 transformer?—Yes.

5. I have some 36 wire. What would be the resistance of a choke?

A.: If you are using a 1-1 core with about 6000 turns the resistance will be approximately 350 ohms.

6. Can R3 in the tuner be entirely eliminated if B plus is taken from the centre tap of the 245?

A.: As far as the voltage is concerned, yes, though it may be necessary to incorporate a high frequency choke in this lead to prevent radio frequency current getting into the power valve.

HOOK UP (Mata Mata): Would copper shield cans be satisfactory for the coils of the Outspan?—Yes.

2. If 32 gauge wire is used for the primary, how many turns will be required?—The same.

3. Is there any advantage in using a larger differential condenser?

A.: A .0002 or .00025 are the best sizes for the Outspan.

4. What ratio output transformer should be used with a magnetic speaker?

A.: Usually a 1-1, though we give this subject full consideration in the 1931 "Guide."

5. Were Lotus Vernier dials used on the original?—No.

6. Is the following valve combination satisfactory: Two S610, two L610, and two M256 in push-pull?—Yes.

E. H. (Karori): Can the specifications for the 250 valve power pack described in the "Radio Record" some time ago be adapted for all-wave rectification?

A.: Yes, the 280 may be used by connecting the high voltage secondary one end to each plate and the centre tap of the filament winding (5 volts) as high tension positive.

2. Can I use the 7.5 volt winding by taking off suitable tappings?

A.: Yes, the best plan is to use one centre tap for both and make the limits of the 5 and 7.5 windings on either side of this. This would not take away the efficiency of the pack.

3. What initial voltage would be necessary to obtain 250 volts rectified?—About 300.

4. Is a former 1½ by 1¼ equal to a former 1 3-8 square?—Yes.

5. How many turns would be necessary on this former to give 2.5 and 7.5 volts?—12, 24 and 36 respectively.

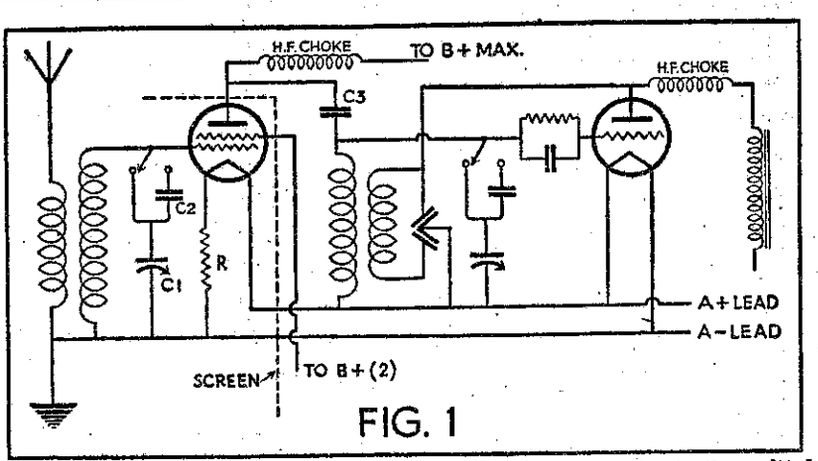

FIG. 1

Theoretical circuit of the "Differential Three." This was inadvertently omitted last week.

"ELECTRODE" (Ponsonby): Can I work a screen-grid valve with power detection straight into a push-pull stage? What is the value of the resonating condenser?

A.: About .25. The system should work quite satisfactorily.

2. Can I use a centre tap speaker direct into the output?

A.: It is not wise, especially with the big drain of 60 mills.

HAROLD (Dunedin): (1) Could you give full details as regards the Pierce earthing system?

A.: See elsewhere in this issue.

2. The shortest and most direct earth is the best. Is this correct?Yes.

3. Is the size of earth immaterial? Will 7/18 insulated do?

A.: The bigger the actual contacting surface with the earth the better; 7/18 will do splendidly.

4. At what height must an aerial cross an iron roof so as not to be weakened by it?

A.: It has little effect above 20 feet.

5. At a distance of about 1½ miles from 4YA, Dunedin, should a long aerial (say 130 feet) bring 4YA in the background of all stations received?

A.: No, with a selective set it should interfere only over twenty degrees, and be heard weakly over thirty or perhaps forty.

6. Will a microphonic valve always give trouble, no matter what stage it is used in?

A.: Rarely. It must be a bad valve to do this.

COUNTERPOISE (Christchurch).—I cannot place my hand on the "R.R." relating to the counterpoise earth. Would you repeat the information?

A.: A counterpoise is really a second aerial erected just far enough from the ground to be clear of all objects that are likely to encounter it. It must be carefully insulated as the aerial itself, and must be connected with the ground terminal, the normal ground being disconnected.

RAGS (Cambridge).—I can tune Wellington at two places on my dial. Why?

A.: This second place is what is known as a harmonic—it is a wavelength half as long again as the original one, and is sent out by every transmitter. It is heard only from powerful transmitters, such as 2YA or one nearby.

Locating Interference Sources

NEW ZEALAND listeners whose reception is marred by interference will be interested to learn that an instrument which takes the guess out of trouble-hunting and accurately measures the quantity of electrical interference in micro-volts per meter has been developed by the General Electric Company of New York.

The new instrument is called a radio noise meter, and is not to be confused with meters made to measure noises audible to the human ear. This meter records the quantity of noise, generally described as electrical interference, made audible only by radio receivers.

The meter locates the source of the noise and measures its intensity. The need for a measuring instrument has been felt for some time, and many radio organisations have been hampered in their efforts to improve radio receiving conditions by the lack of a standard testing instrument and a standard of measurement. The noise meter makes possible a comparison of the test results of different investigators; it gives manufacturers of electrical apparatus a means for measuring the amount of radio noise created by the apparatus. In addition, an invaluable method of obtaining data upon which fair and reasonable rules and ordinances may be based is provided.

Many municipalities, anxious to protect radio listeners from excessive electrical interference, have passed ordinances limiting "permissible" interference. The trouble, heretofore, has been to define "permissible."

The radio noise meter consists of two parts, a receiver unit to detect and indicate radio noise, and a calibrating unit to measure the intensity of the noise in micro-volts per meter, which is the customary unit of measurement of radio signals.

The receiver is enclosed in an aluminium box, and weighs thirty pounds. Six valves are used. The pick-up is obtained with a rod antenna, two meters long. Using the meter a radio noise corresponding to a field intensity of three micro-volts per meter may be measured. With the headphones it is possible to measure still lower noise levels. A search coil may be used to investigate noises around motor brushes, transformer ground leads, etc.

The calibrating unit is also enclosed in an aluminium box which is fastened to the side of the receiver, and it is so designed that the radio noise may be measured with any antenna that may be used with the receiver. The output of the calibrating unit may be varied from zero to 10,000 micro-volts per meter.

A feature of the instrument is the standard noise created, by means of which it becomes possible to measure the intensity of the interfering noise. Operation of the instrument consists in adjusting the intensity dial until the standard noise reads the same on the meter as the radio noise. The intensity in micro-volts per meter is then read from a curve. Switching from standard to radio noise is accomplished by depressing and releasing a key switch. The standard noise is obtained by alternately charging a network of small condensers from a dry battery and discharging into the antenna in such a way as to produce a noise that closely imitates the usual transmission line noise.

The portability of the instrument makes it readily applicable to tests in the field, in the home, or wherever the radio noise may occur. It is especially useful to measure radio noise on transmission lines, house-wiring, around distribution points, or electrical apparatus of any description.