

the eliminator. Have it tested by a reliable dealer. It may be that the valve is at fault.

NU OHUM (Havelock North).—Is it possible for an amateur to build a shortwave adapter for an all-wave electric set? Where could the circuit and layout be obtained?

A.: The most suitable adapter would be a super het. One of the type described in the 1931 "Radio Guide." See the article on shortwave adapters in this month's "Radio Log."

2. Can one get particulars of the "Radio Crystal Set?"

A.: This set was described in the 1930 "Radio Guide."

R. E. C. (Raetihi).—Could you give a brief description of the Beverage aerial?

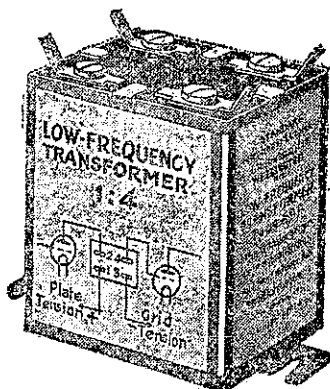
A.: A Beverage aerial consists of a wire about 400 yards long, slung about ten feet above the ground just clear of stock, etc. The wire is not necessarily stranded wire and can be ordinary galvanised iron wire. The distant end must be earthed to a 750 ohms resistance.

2. What are the chief advantages of a Beverage aerial?

A.: The signals are brought in louder than they are on the average aerial. It is strongly directional and the end which is earthed must point toward the stations which are to be supplied.

3. Can you supply information or feature an article for the construction of a shortwave converter?

A.: See the reply to the above correspondent. A complete description of the



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Fixed Condensers

Test and Working Voltages

This week we deal with the third question in Section B of the Radio Serviceman's Examination. The question reads: "A fixed condenser is marked tested 500 volts d.c. State the highest voltages you would apply to it for continuous working (a) in a battery-operated amplifier; (b) if coupled across an a.c. circuit. Explain how you would arrive at these values."

THE question does not call for a treatise on condensers. It asks for a simple fact which every serviceman should know. Condensers are tested, unless otherwise stated, by the flash method, which means that a high potential is flashed across the condenser. Some of the better known makes of condensers are tested for a few seconds at this high voltage, but this is not the potential at which the condenser is designed to operate and for normal purposes; one must take half the test voltage as the working voltage. Thus, in this case, one would not apply more than 250 volts to the condenser for safe working.

Much depends upon the position the condenser will occupy in the amplifier. If used in an output filter there is a chance that higher voltages will be built up through the loudspeaker circuit. If a power valve employing 250 volts on the plate were used in the last stage, it would be unwise to associate with the output filter a condenser tested at 500 volts. It would be better to use a higher test condenser or limit the voltage to 200.

B. In an a.c. circuit conditions are somewhat different. The voltage shown on an a.c. meter is not the total voltage across the circuit. This voltage shown is known as the r.m.s., and is the average one, but owing to the nature of alternating current there is a peak voltage, which is 1.414 times the r.m.s. voltage, and this we must allow for in designing the circuit. If the safe working margin of the condenser is 250 the peak value of the current must not exceed this figure. If we applied mathematics to the problem it would be found that r.m.s. value is equal to .707 of the peak value and .707 of 250 is 175 approximately. Thus for continuous working in an a.c. amplifier no higher voltage than this should be used.

Where surges have to be allowed for, and they are not infrequent in a.c. operated amplifiers, a still lower value of working voltage must be taken. Surges are rarely more than 10 per cent. working voltages, and this brings the "safe" voltage down to about 150. It is unlikely, however, that this point was implied in the question.

Bereavage aerial appeared in the 1931 "Radio Guide" and in the "R.R."

CONSTANT READER (Gisborne).—My five valve screen grid set radiates. Can you tell me a good circuit that will not?

A.: A screen-grid set, unless it is very poorly designed, will not radiate. Are you quite certain your set is radiating? Do not listen to everything you are told. The "Radiogram Five" is not a radiating set.

A. 473 (Helensville).—Is it safe to disconnect the speaker of an all-electric set while using phones?

A.: You can disconnect the speaker voice coil but not the field, which is usually incorporated in the power pack. If, however, the field supply comes from a separate rectifier you will be quite in order to disconnect it entirely.

W. B. E. (P.N.).—A fortnight ago the speaker of my six-valve set started to heat although the tone and quality are splendid.

A.: It sounds as though you have a breakdown in the voice coil which is now passing more current than it is designed to do. You had better consult a radiotician who can soon tell you if there is anything wrong. Neglecting it may possibly cause more serious trouble.

2. What is the correct place for a pick-up jack in the set?

A.: Between the grid and cathode of the detector.

ABERDONIAN (Wellington).—Can I use a three-valve set with batteries? I am now using an eliminator.

A.: Yes, the set will operate quite satisfactorily on 120 volts "B."

2. If I decide to alter the set to a shortwave five-valve set, could this be

S625 (Invercargill).—I wish to use S625 with a shortwave detector having no audio stages following. What is the size of the condenser in my circuit?

A.: Approximately .0001—.00025.

2. Would I make the secondaries in accordance with the table in the "R.R." and experiment with these?—Yes.

3. Would the method of supply the h.t. to the S.G. and plate be, in your estimation, satisfactory.

A.: Yes; we think the method would be quite satisfactory, although it may be better to make the screen voltage variable and the plate voltage fixed.

J. E. H. (Marborough).—I have a battery set earthed to the water service to which also is earthed the telephone. When the telephone rings it can be heard in the speaker. Will this injure the set?

A.: No; but if you want to avoid the annoyance have a separate earth for the set—say a water pipe driven into the ground.

BIMBO (Rongotea).—Of the aerial you suggest the one 60 feet high at each end and 100 feet long is the best although you had better shorten the flat top, otherwise you may have selectivity trouble. 100 feet total length including the lead in is about all that is required for a modern eight valve set. Nevertheless try the big aerial by erecting it on halcyards so that it may be let down, and if it should cause the set to be unselective, you can let it down and put on longer spacing wires and so shorten it.

Useful Hints

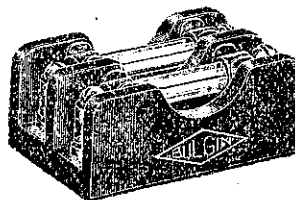
WHEN drilling ebonite remember that the drill will tend to wander unless, after the exact point has been marked, a centre punch is used to give the drill a start on the panel.

THE pentode valve used instead of an ordinary output valve will often give a pleasing "brilliance" to moving-coil loudspeaker reproduction.

IF you are using a screened set which has copper foil covering the baseboard, be sure to avoid creases and inequalities in its surface, as these are a fruitful cause of shorts.

DO not neglect the adjusting screw on your loudspeaker, as the exact distance of the permanent magnet from the diaphragm (controlled by this) is of great importance in getting maximum sensitivity.

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