

(Continued from page 27.)

core, or both. A transformer with high primary impedance is of low ratio, 3 or 3½ to 1, and there is less chance of distortion from a low ratio than from a high. The high impedance primary of a well-known transformer contains a mile more wire than the windings of the ordinary type. Now, if a transformer gives high amplification of the low and middle frequencies, it should also amplify the high notes equally well. If it is of good design, it will do this, and its peak or highest amplification may be around 4000 cycles, after which amplification will fall off. The small and cheap type of transformer has a high amplification peak on the high frequencies, but falls off rapidly lower in the scale, so that the lower frequencies weaken rapidly, and the lowest are entirely lost. Sometimes this is not always quite a disadvantage, for a poor type of horn speaker would not properly reproduce the low notes if they were there. To obtain good quality amplification at high frequencies, it is necessary that the windings should be divided up into sections in order to prevent loss through internal capacity.

Fixed Condensers.

A PART from the indispensable impedance coupling condenser in the first audio stage, the writer has no tone controlling or other condensers in his amplifier. The only other condensers present are the one built in the Ferranti A.F.3 transformer and one in series with the horn speaker to suppress low notes. Many constructors will find that by shunting condensers of different values across the loudspeakers, they will be able to settle upon one that gives best results and may be incorporated in the circuit permanently. Tone control units have been constructed for the purpose, giving facilities for switching in different condenser values. The effect of such shunting condensers is to soften or subdue the high notes. If a resistance is placed in series with the speaker, it reduces the low tones more than the high.

THE fixed condensers across the primary windings of the first and second audio transformers have a considerable influence upon the range of notes passed. Increasing their capacity reduces the high notes, so that a "screechy" or "tinny" effect may be subdued by their increase. A shunting condenser may not always be necessary across the second primary, and is not always absolutely essential across the first, especially in the Reinartz circuit and its modifications, but it will pay to conduct a few experiments in this direction. An attempt should also be made to remove the conditions that necessitate such modification by adding capacity.

Valve Influence.

THE last valve plays a highly important part in reproduction, and only a power valve of suitable characteristics can satisfactorily handle the output of an efficient circuit employing four or more valves. To run such a valve properly, there must be no lack of B current. The plate current is the equivalent of power, not because of the steady plate current, but because the fluctuations of that current, caused by the impulses on the grid, are what actuate the speaker. Signals on the grid affecting the flow of plate current cannot reduce it to more than zero, so that the greater the current, the more can

the variation or fluctuation be. There is a wide range of volume in most music, which cannot be properly handled by a set that has been designed chiefly with a view to B battery economy.

Where dry batteries are used, better output may often be obtained from the last valve by increasing the plate voltage, provided that the speaker will stand the extra direct current. An output filter provides against any possible trouble in that direction.

Actual tests show that lowering the resistance of the output valve in any way increases the lower notes in strength, but may not seriously increase the high notes if the output circuit is adjusted to have a high impedance, in which case the full increase of power may be obtained with the tone unimpaired.

Filter Control of Tone.

WHERE a choke-condenser output filter is employed, if the lower notes are too predominant, the coupling condenser between choke and speaker may be reduced. If the high frequencies are too prominent, some of them can be shunted away by means of a condenser of small value placed across the choke coil, thus allowing these frequencies to pass through the condenser instead of setting up voltages across the choke.

NOTHING has been mentioned about grid-bias, for although it has a great influence upon quality it does not come within the scope of this article. The whole movement is towards better reception in every way, and without correct grid-bias no two-stage amplifier can function satisfactorily for loudspeaker volume.

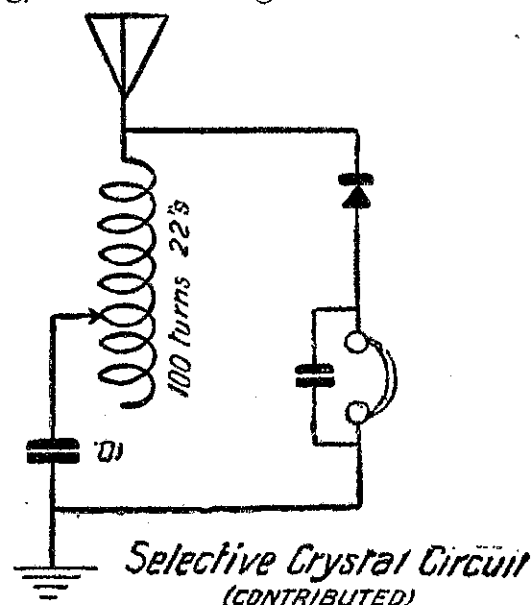
Some listeners would no doubt think they were hearing the lowest notes of the frequency test when they were only hearing the overtone an octave higher. The writer found the crystal a handy check in this connection, switching off the B eliminator and listening to the crystal with headphones.

One experienced constructor writes to say that whereas he was only able to hear frequencies up to 4000, his wife could hear up to 8000.

In last week's article it was stated that the frequency of high harmonics would reach as high as 30,000 cycles. This should have been 16,000 cycles.

A Crystal Circuit

A WELLINGTON reader interested in crystal circuits sends the following, recommending it for selectivity.



The circuit is tuned with a slider or similar arrangement, no variable con-

denser being necessary. Selectivity is gained by a fixed .01 condenser in series with the inductance of 100 turns on 3in. former. Other parts required are 2 terminals, 2 'phone terminals, crystal, and 1lb. 22's enamelled wire. The condenser (.001) across 'phones is optional.

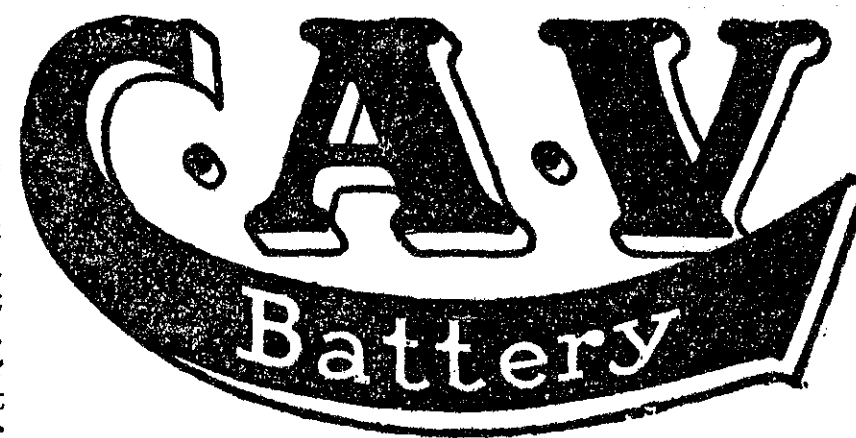
Linen-Diaphragm Speaker.

THIS is undoubtedly a fine type of speaker, giving a wider range of frequencies than the majority of speakers. A Wellington firm, Messrs. J. A. Smyth, 71 Victoria Street, has on order to arrive next month a shipment of these speakers knocked down ready for assembly by the purchaser. Everything necessary is included, frame, unit, silk diaphragm, "dope" for same, and all the tacks. The large and small diaphragm is the pattern, which appears to be the one most generally adopted. The price of the kit is to be

£4 10s. A supply of extra units has also been ordered.

Power Line Interference.

AN American claims to have solved the problem of getting quiet reception in close proximity to high-voltage power lines. He has erected a 60-foot pole with 3ft. L-piece at top and diagonal supporting brace like a gallows. From the bracket is suspended an ordinary five-wire cage aerial with rings six inches in diameter, with lead-in from the lower end, the total length of the cage portion being 20 feet. Outside the end rings of the cage are suspended two aluminium rings, a foot in diameter. Six wires connect these two rings, and the wires join at the top to form a suspension above the top of the aerial. The lower end of the ring arrangement is connected to earth by a suitable wire. The actual length of the outside cage or screen from ring to ring is given as 12 feet. This is giving good results within 100 yards from a 60,000-volt line.



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