

### The Plate Circuit.

IT is necessary, now, that the electrons in the filament be drawn to the plate of the valve. For this reason the plate must be heated by a flow of electricity, different from that in the filament, to attract the electrons, and to accomplish this a B battery is introduced in the circuit. The positive terminal will go to the other side of the terminal, while the negative terminal to link the B battery up with the remainder of the circuit, will go to the A negative or A positive. If it goes to the A positive, the B battery voltage will be raised by the amount of voltage on the A battery; thus the A battery helps the B.

This now completes the one-valve amplifier. All one-valve audio amplifiers are more or less the same as this. These are the general principles for audio amplification, and it will be found that even the most complicated receivers will fall back on these fundamental principles.

A diagram showing such a circuit was given last week.

### The Double Grid and Pentode Valves.

WITH these types of valves an extra grid or grids is provided. In the case of the double grid valves the extra grid reduces the plate voltage if necessary and, in the case of the pentode, helps to boost up the amplification. In the case of the pentode a high plate voltage is still required, but the amplification and the capacity of the valve is greatly increased.

With both these valves an auxiliary terminal is provided on the side, and is to be connected directly to the B positive. This may be done by running straight on to the battery or going to the positive terminal of the speaker. The correspondent wrote in last week's issue asking for some details of the use of this valve. They simply can't be given. All is plain and straightforward.

The double grid valve requires only 22½ volts on the plate, and is highly suitable for a single stage of amplification such as the average crystal user would like to add. "Galena" has been using such a circuit for some considerable time, and it has given nothing but satisfaction. The valve makes the set no more difficult to operate, and has a very low running cost.

If the constructor is willing to provide a high B battery voltage, that is, approximately 90 volts, he can do little better than employ the Pentode valve, which will give very fine amplification, but with a fairly high running cost. The diagram showing the connections when there are two grids is shown below. The full descriptions of such a set appeared in our special issue, but the foregoing remarks will enable any constructor to use one.

per cent. of the efficiency is being lost through an overgreat resistance, which means that the whole trouble is centring round the low voltage delivered from the transformer.

E. F. C. (Papatoetoe) writes asking whether to charge the A battery he should connect up the B positive and B negative and leave in the lamp. He has not had good results.

ANSWER: B positive and B negative should not be connected for charging the A, neither should the lamp be left in. This correspondent might also be referred to the above suggestions, and, in addition, he would be wise to strengthen his solution.

## Our Crystal Corner

By "Galena"

As far as the writer can ascertain the Philips A441 is the only valve of the double grid type obtainable in New Zealand. However, of the Pentode valves most of the makers now turn out some very fine products, and anyone constructing should consult their dealer to find out which he considers to be the most suitable make for his requirements.

### Notes on Assembly and Operation.

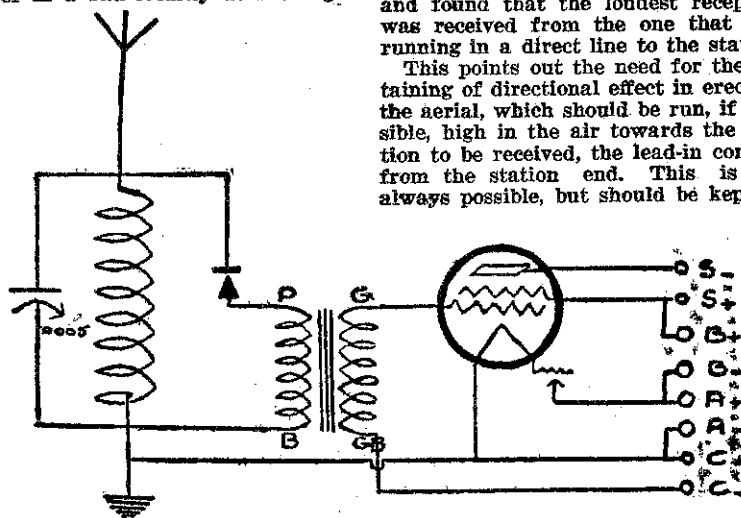
IN choosing the amplifier for his crystal set, the beginner has first to take into consideration his locality. To work an amplifier of too low power in a bad locality does not give

appeared previously in our paper, particularly in the special issue.

There is one outstanding point that the amateur must bear in mind, that is, the direction of the aerial.

One young constructor known to the writer had a very ingenious aerial. After some effort and the co-operation of all the family, he had raised a conspicuous mast some 40 feet into the air. From this, he ran several wires to his house, which was much higher than the aerial. He had spaced the wires so as to get the maximum effect, but had the aerials so arranged that he could receive off one wire if he so desired. He then tested each separately, and found that the loudest reception was received from the one that was running in a direct line to the station.

This points out the need for the obtaining of directional effect in erecting the aerial, which should be run, if possible, high in the air towards the station to be received, the lead-in coming from the station end. This is not always possible, but should be kept in



Theoretical Diagram.

satisfaction, and great care has to be exercised in the selection of the right circuit for the right position. It is well to look around among the other radio enthusiasts in the district, and find out how reception is in that area.

This varies from place to place in a most remarkable manner. Reception may be good in one point, while in another, just a few miles away, it may be particularly bad, and require another valve to bring the crystal output on to the loudspeaker satisfactorily. Hills and bush have a screening effect, and should be taken into account by the constructor, and if he finds that the output from one valve is not sufficient, he should not be too ready to blame either the circuit or the valve.

### The Direction of the Aerial.

ANOTHER very important factor to be borne in mind by the constructor is his aerial. The output from a crystal is not particularly great, and everything has to be taken into consideration in order that he may get satisfactory loudspeaker strength from his amplifier. Not the least among these is the aerial.

Screeds have been written about this important part of the receiving apparatus, and reiteration here is both unnecessary and uncalled-for. Reference can be made to articles that have ap-

view by everyone erecting an aerial to receive from one station only, and crystal reception from any other but the local station is not worth while, even with an amplifier.

### The Lay-Out.

MANY young constructors with a business-like eye and a business-like method of construction, search through, and find out "many different circuits" of crystal sets and amplifiers, to turn down several as "no good." This is a fatal mistake, as there is really no difference between crystal circuits. Some are more selective than others, perhaps, but selectivity should not be the aim of the crystal user in New Zealand.

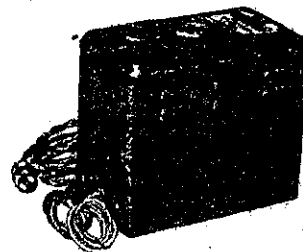
In most cases, especially where an amplifier is being used, the trouble is caused through defects in the lay-out. There are several important points to watch in this respect, and the constructor should, where possible, follow the lay-out diagram which almost invariably follows the theoretical diagram of the set which he is to construct. In some cases, alteration is essential, and in altering, the following points should be borne in mind:

1. Keep the wires going to the grid of the valve, short; insulate them well; and keep them off the base-board.
2. The plate wires are to be kept well away from the grid wires, likewise well insulated, and clear of any conductor.
3. Filament wires, and battery leads, may be bunched. Do not leave them straggling about the set as one sees in so many home-constructed jobs. This is not only unsightly, but is very liable to cause short-circuiting.
4. Keep your components well-grouped together, and many of the troubles enumerated above will not be encountered. Besides the set is given a neat and business-like appearance.
5. Do not let the coil get into contact or into proximity with either the condenser, the crystal, or the wooden base. It should be well insulated, otherwise the operator will find that his volume is sadly reduced.

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