Valve Circuits

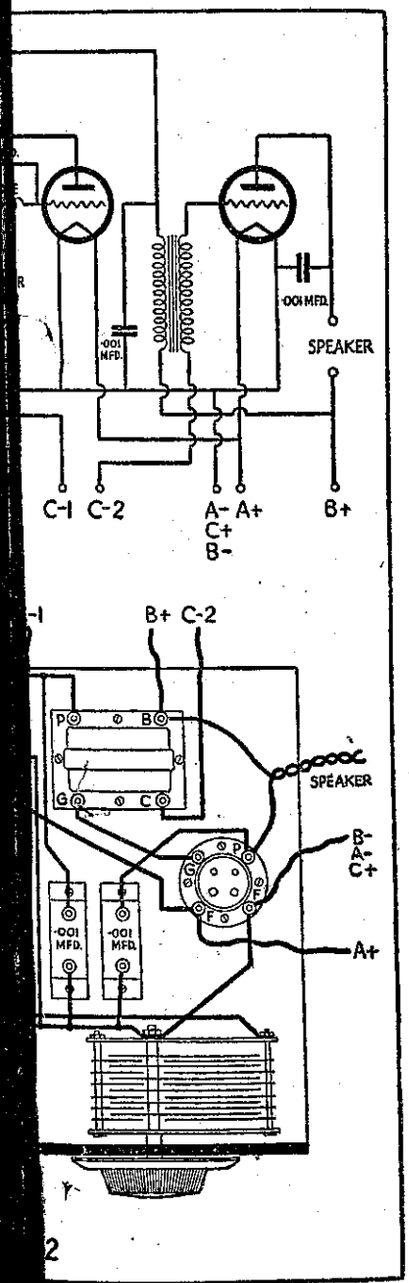
Details of the ıadyne

THODE")

A filament switch may be included to avoid the inconvenience of connecting and disconnecting the "A" battery. If this is done, the switch should be located in the A+ head.

The Valves Required.

THE first valve should be of the L.F. type, having an impedance of 6000 to 10,000 ohms; the second may be a small power valve, or, very near a broadcasting station, a super-power valve. A high plate voltage is desirable, and 90 or 100 volts must be regarded as the absolute minimum. The "C" voltage should be that recommended by the valve makers for the particular plate voltage employed. Do not make the mistake of using too high a "C" voltage with a view to economising in plate current, as it is important that the first valve shall not rectify, and it would be likely to do this if biased too much.



oretical diagrams.

Operation of the Trinadyne.

THE operation of the "Trinadyne" is exactly the same as that of other receivers, except that the crystal detector must be adjusted. As a matter of fact, the best method of doing this entails putting the receiver into oscillation for a few moments. The carrier wave of a rather weak station is tuned in with the detector roughly adjusted and the set just oscillating. Then the set is brought just out of oscillation and the detector adjusted until signals are at their strongest and clearest. Once adjusted, a detector of the semi-permanent type should maintain its adjustment for a considerable length of time.

"Cathode" feels sure that those readers who construct this little set will be surprised and delighted with their results. He would particularly like to hear from readers regarding results, etc., as the set is one with which he himself has spent many very delightful hours.

The "Hale" Circuit

IN Fig. 3 is shown in outline a typical "Hale" circuit. Many readers will remember the immense popularity which this circuit achieved a year or two ago in England, and it is indeed a delightful subject for experiment, being capable of many interesting variations.

It must be confessed, though, that it lacks the absolute reliability of the "Trinadyne," since not every audio transformer will consent to function in the rather involved manner demanded of it. Moreover, the crystal detector must necessarily be of the semi-permanent type and, even among this type, some units will be found very much better than others.

How It Works.

THE Hale circuit depends for its operation on the self and mutual capacities of the windings of the audio transformer. The high-frequency impulses from the tuned circuit are applied via the primary of the audio transformer to the crystal rectifier.

Considered as an inductance, the winding of the transformer would effectively bar the passage of high-frequency currents, but a large winding like this always possesses a considerable self-capacity, and through this unintentional condenser the high-frequency currents readily make their way.

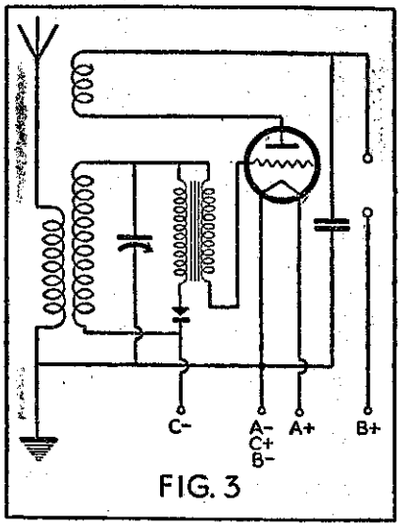


FIG. 3

The Hale Circuit.

The audio output of the crystal also flows through the transformer primary, of course, since this forms a part of the crystal circuit. Energy is transferred to the secondary of the transformer and the resulting E.M.F. is applied to the grid of the succeeding valve. The valve operates as an audio amplifier and the signals are audible in phones connected in its plate circuit.

So far, then, it seems that the arrangement operates similarly to an ordinary crystal transformer-coupled to an audio amplifying valve.

Reaction.

IN addition to the self-capacity of the primary, however, the audio transformer possesses a mutual capacity between primary and secondary and via this second unintentional capacity a part of the high-frequency current is applied directly to the grid of the valve. The valve amplifies the high-frequency currents and by coupling a reaction coil in the plate circuit to the tuning coil a reaction effect may be secured in a very similar manner to that obtaining in the case of the "Trinadyne."

It has already been explained how potent is reaction in reducing the damping effect of a crystal detector so that it will be gathered that, onec properly adjusted, the "Hale" is capable of giving the same remarkable results as the "Trinadyne" and others of its kin. Its principal objection is that, as mentioned before, there is sometimes a little trouble in finding a transformer which will get the best out of the circuit. A splendid field for experiment, though.

Further notes concerning the "Hale" will appear in the next article of this series. It is hoped also to make a start with the problem of powerising receivers of the crystal-valve type.

"One-man" Sets

THE "New York Times" quotes the following remarks made by W. R. Bryan, Professor of Mechanical and Machine Design at New York University, anent the pressing need in that country for "one-man" sets.

Loudspeakers are driving hundreds into the divorce courts annually," said Professor Bryan. "No two members of a family want to hear the same radio programme. What is music to one ear is merely a neurosis-producing racket to another. In this apartment age each person should be equipped with a small portable radio set which could be plugged into a light-socket.

"Then without annoying each other, mother, with comfortable sponge-rubber earphones, could tune in on the opera, dad on the fights, sister on the dance orchestras, and little brother could do his homework, at last, in peace."