



The 1-Tube "Oscillodyne" in actual operation. This is the set shown on our front cover.

The "OSCILLODYNE"

1-Tube WONDER SET

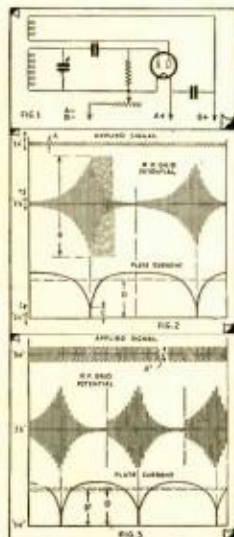
By J. A. WORCESTER, Jr.

This is the first of a series of articles on the "Oscillodyne" prepared by the inventor of the circuit, Mr. Worcester. The second article will appear in the next issue.

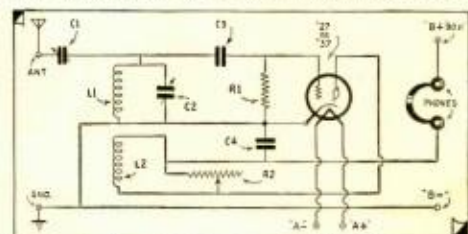
Part I.

THE short-wave receiver which is described in this article depends for its operation on a principle which the writer believes is presented for the first time herewith. This receiver, while not presented as destined to replace existing methods of reception, is, nevertheless, in many respects the ideal receiver, particularly for the short-wave beginner or would-be beginner who is interested in obtaining the maximum "results per dollar" obtainable. The fundamental circuit is shown in Fig. 1. A cursory examination will indicate that it is nothing more than a simple oscillatory circuit. The feedback, however, is considerably greater than that required for the mere production of sustained oscillations, being of sufficient magnitude to produce irregular oscillations. This means that the oscillatory circuit is periodically rendered inoperative at a frequency dependent on the amount of feedback and on the value of the grid condenser and leak. In this receiver the oscillations are stopped and started at a super-audible frequency by proper selection of these

three constants as explained later. The manner in which such a circuit can be employed for the reception of radio frequency signals can be described as follows. In Fig. 1 is represented a high frequency disturbance of amplitude "A". If such a signal is present on the grid of the oscillator, the signal will build up as in Fig. 2B. In an ordinary oscillator, oscillations would build up to a value "B" (determined by the tube characteristic), as shown by the dotted lines of Fig. 2B. In this circuit, however, the feedback is too great to allow the electrons on the grid to leak off sufficiently fast to maintain a constant mean grid potential. The result is that the mean potential of the grid decreases, causing a corresponding decrease in the plate current as in Fig. 2C. As the plate current decreases the plate resistance increases, causing a decrease in the mutual conductance of the tube. Finally the plate current is reduced to a value "C" at which the mutual conductance is no longer sufficient to maintain oscillations and they die out as shown in Fig. 2E. The negative charge accumulated on the grid of the tube then leaks off at a rate determined by the time constant of the grid con-



Graphic diagrams employed by the author in connection with the text to explain the interesting action taking place in the "Oscillodyne."



Schematic wiring diagram showing how to connect the few simple parts composing the "Oscillodyne."

A REALLY NEW CIRCUIT

WE are pleased to present to our readers an entirely new development in radio circuits. Under the name of "The Oscillodyne," Mr. J. A. Worcester, Jr., has developed a fundamentally new circuit, and he describes the theory as well as the practical application in this article. This circuit, which is of the regenerative variety, acts like a super-regenerative set, although it does not belong in this class. Its sensitivity is tremendous.

The editor, in his home on Riverside Drive, New York, in a steel apartment building, was able to listen to amateurs in the Midwest on this simple one tube set, using no aerial and no ground.

With a ground alone, a number of Canadian stations were brought in, and with a short aerial of 40 feet length, many foreign stations were pulled in easily.

This circuit is certainly an epoch-making one which should find immediate acceptance by the entire radio fraternity. The circuit has the advantage that it is not tricky if good material and common sense are used.

The set was tested in different parts of the East, and it has been found that the results are satisfactory in practically every location.

In our own estimation, the Oscillodyne is one of the greatest recent developments in radio circuits, and the editors recommend it warmly to all readers.



Rear view of the "Oscillodyne" with parts labeled to correspond with those in the diagram.

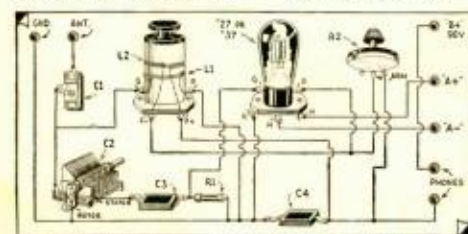
denser and leak, whereupon the cycle repeats itself as shown.

A similar group of curves is shown in Fig. 3 for an initial disturbance having five times the amplitude of that in Fig. 2. The important thing to notice is that the average plate current ("D" in Fig. 3C) is less than in the preceding case due to the greater number of "dips" the plate current makes during a given interval of time. Thus, it becomes obvious that a variation in the intensity of the signal applied to the grid results in a corresponding variation in the average plate current. Consequently, a modulated radio frequency signal will produce audible variations in the current flowing through the earphones in the phone circuit.

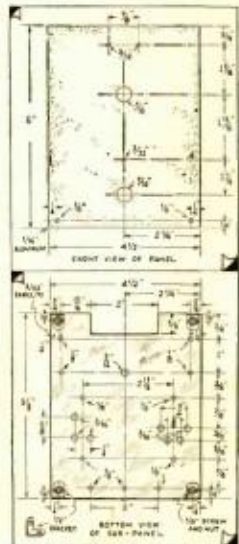
To sum up, it can be stated that the operation of this circuit depends on the fact that no oscillatory circuit, prior to the establishment of sustained oscillations, the time required for an impulse to build up to a given value is proportional to the initial value of that impulse. This contrasts with the super-regenerative circuit in which

use is made of the fact that the value to which an impulse will build during a given interval of time is dependent on the initial value of that impulse.

Before leaving the theoretical side of the subject it might be advisable to point out that for proper operation of the circuit it is necessary that the oscillations in the grid circuit entirely die out during the period in which the charge is leaking off the grid. This is to enable the next train of oscillations to build up from the amplitude of the signal present on the grid at that time and not from the amplitude of the preceding train of oscillations which would otherwise be present. Thus it will be found that for satisfactory reception of broadcast frequencies the damping constant of the coil and the condenser combination ($R_1 C_1$) is not large enough without adding considerable external resistance, which necessitates a corresponding increase in the feedback employed. The feedback cannot be increased indefinitely, however. (Continued on page 747)



Picture wiring diagram for building the "Oscillodyne," an "A-B-C" analysis of the set.



Largest of the "Oscillodyne" receiver panel and subpanel.