

# A Diagnosis of Radio

## Resistances

(By the Technical Editor)

(Continued from previous issues.)

WE all know that the word "resistance," whether applied to radio or not, means that something is hindering something else. We know, too, that if we connect certain wires and radio components with a battery, or with some source of current, that current will flow through those wires. If we introduce something that will hinder

where  $E$  is the emf. or voltage dissipated, and  $I$  is the current passed.

If we have a resistance of a certain number of ohms and pass through it small current, the voltage dropped will be correspondingly small, but if we pass a greater amount of current through it there will be a greater drop in voltage.

Now this brings us to an important point. The material of which a resistance is composed carries only a certain amount of current, and if we attempt to pass more current through it than it is designed for, it will become hot and will probably burn out. For this reason every resistance is not only rated in ohms, but also in carrying capacity, and it is important to see that each resistance is not given more work to do than it is designed for.

Fixed resistances are used in the power pack to break down the voltage for the different uses it has to be put to; in a resistance capacity coupled amplifier; as a grid leak in order to bring about detection; as a grid bias register to develop a difference in potential (voltage), to bring about bias; and in the filament supply, to keep this at the proper level.

Variable resistances are generally of two classes, the rheostat and the potentiometer. The rheostat has only two terminals, the one attached to the moving arm, and one end of the resistance itself, but we can vary the distance between the movable arm and the fixed terminal, and so put in any desired amount of resistance.

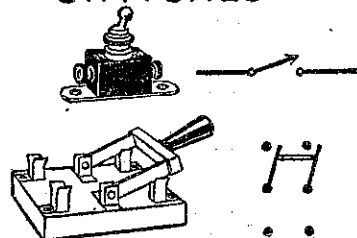
A potentiometer (that name, is really incorrect) has three terminals, one at each end of the fixed resistance, and the third is the variable tap. This can be settled at any point between the two. It is arranged so that there is a constant number of ohms between the two outside terminals. The potentiometer is used across filament supply, so that the "B" current can be brought into the centre tap: as volume control; and to provide a variable return in the detector circuit.

## Switches

A SWITCH is a very simple piece of radio apparatus, its function being to make and break a circuit.

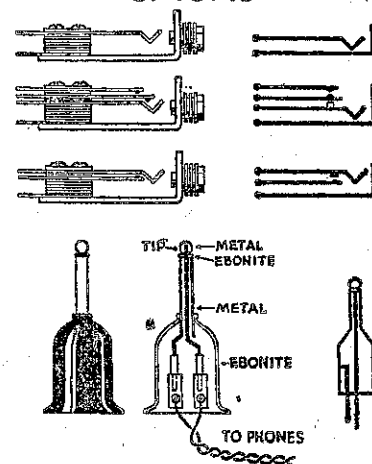
A switch may be one of several types.

## SWITCHES



A jack, as can be seen from the illustration, is only a piece of metal bent at right angles, called the body, with

## JACKS



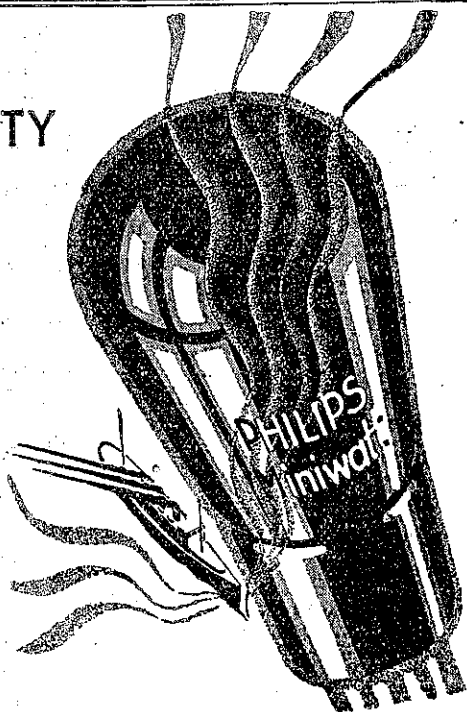
a bent spring arranged at a convenient distance from the body, and in such a way that it will not contact it. A plug which provides a means of bringing any outside piece of apparatus in contact with the jack, consisting of a metal cylinder fitted inside a hollow ebonite (Concluded on page 30.)

## Jacks and Plugs

A JACK provides an easy way of making contact with any circuit.

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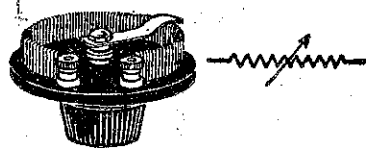
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## RHEOSTAT



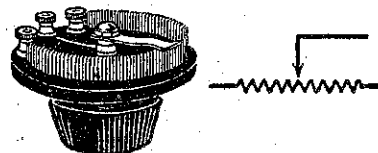
the passage of that current, we are introducing a resistance and limiting the amount of current that will flow. Now we know that if a water pipe is dirty, or blocked, i.e., if there is a resistance to the flow of water, not only will less water pass, but it will have less pressure, some of this latter quantity being absorbed in the resistance itself.

Now that is exactly what happens in the radio circuit.

The resistance causes not only a decrease in the number of amperes which term indicates the amount of current flowing, but also causes a certain drop in voltage, which measures the pressure.

Everything through which current flows has some resistance, but ordinary wire and certain components have a

## POTENTIOMETER



very low resistance, and we can disregard their effect. Other components have a high resistance.

There is another class of resistance which we are going to consider now, and that is the special ones. These, as the name implies, are devices used purposely to break down the voltage and limit the flow of current in certain parts of a circuit. We divide these into two main classes, fixed resistances and variable resistances.

The fixed resistance can be rated at a certain value, whereas the value of the variable resistance can be changed within certain limits. A resistance is rated in ohms, and the number of ohms in any resistance is given by the amount of current flowing through it, divided into the voltage that the resistance does away with, or to use a more technical term, the voltage that the resistance dissipates.

If a resistance, passing one ampere of current, breaks down the voltage by one volt, its resistance would be one ohm. In other words,  $R = E \div I$ ,