Slide Wire RESISTORS

When exact resistance required is unknown but must be arrived at by experimental adjustment...and perhaps changed occasionally for altered operating conditions...but all the while must "stay put", be noiseless, be dependable...use AEROVOX Slide Resistors.

Built precisely like fixed Pyrohm Resistors...same selected resistance wire, accurate winding, porcelain vitreous enamel coating, positive conduction throughout for noiseless operation. Narrow track cleared through enamel coating for contacting the wire turns. One or more contact bands. Horizontal mounting brackets.

Note this detail. In AEROVOX Pyrohm Resistors, a few turns of the end of resistance wire are wound around a lip raised from the terminal on which they are wound. While others mainly coat this junction with cement, protecting joint from entry of enamel when unit is fired. AEROVOX goes one important step forward by using a special silver soldering process that joins resistance wire and terminal electrically, and effectively prevents entry of enamel or formation of any voids films.

Thus positive conduction from terminal to terminal...at all times...under all operating conditions. Resistance values "stay put". No resistance fluctuations. No troublesome "noises", no matter how sensitive the circuit.

Pyrohm Slide Resistors are available in 10, 25, 50, 75 and 200 watt ratings. Resistance values of 1 to 100,000 ohms. Furnished with one contact band and horizontal mounting brackets. Extra contact bands available.

New Catalog: 1935 Edition just off press...sent on request.

CONTINUING with the discussion of condensers and their applications, the next group of applications includes those where a condenser is used in order to obtain frequency discrimination. A typical example is the conventional tone control.

The most common type of tone control consists simply of a fixed condenser and a variable resistor. A device of this nature hardly deserves the name of tone control for its controlling action is very much limited. It can reduce some of the high notes but cannot do anything about either the low or the middle notes. Furthermore, the cut-off of high notes is not sharp but very gradual as we shall see. This type of tone control, however, has been found useful for the reduction of harsh noises as well as balancing the deficiency of low notes in midget receivers so that the total becomes acceptable.

Fig. 8 illustrates a tone control, used in the plate circuit of an output tube. For the sake of numerical examples it is necessary to give values to all circuit elements and we shall consider that the output tube is a pentode like the 2AS, 42 or 16 all of which have the same characteristics as an amplifier. The results obtained from these examples, however, are equally applicable to other tubes and other tone control circuits.

If the voice coil of the speaker is correctly matched to the tube, it is reflected as 7000 ohms into the plate circuit. For the purposes of this article, it will be assumed that this load is resistive. We can then draw the equivalent circuit as shown in Fig. 9. The tube can be replaced by a generator delivering a voltage equal to the load voltage applied to the grid, and having a series resistance equal to the plate resistance. The manufacturer gives this plate resistance as 7000.ohms.

It is now required to find the variation in current or voltage delivered to the 7000 ohm load. The voltage across the 7000 ohm load will be proportional to the current flowing through it. But this current is out of phase with the current flowing through the tube control circuit, the phase difference being less than 90 degrees. The vector sum of the two currents is of course in phase with the current through the tube but the voltages across the tube and the load are again out of phase by a different odd angle. Therefore it is necessary to determine the voltage across the combination load and tone control by calculating the equivalent impedance of the parallel branches adding it vectorially to the impedance of the tube and finding the total impedance. The voltage divides across the tube and the load in proportion to their impedances, so we can find the voltage across the load. When this is done for different values of C and R and at different frequencies, it is possible to get an idea what happens to the frequency characteristic when this type of tone control is used.

Supposing it is required to attenuate the 5000 cycle notes at least 20 db (reducing the voltage to 10% of its normal value) with the tone control fully advanced. The required value of the condenser to accomplish this purpose can be found from the law of impedances in parallel. The nearest commercial value is 0.01 mf. This will reduce the voltage across the load to 8.1% of its normal value at 5000 cycles.

The table below, Table I shows what percentage remains at several selected frequencies and also what hap...
In one successful design of an audio amplifier, two such tuned stages were used. The two stages were tuned to slightly different frequencies, 70 and 80 cycles, which results in raising the action somewhat. When it.

**APPLICATIONS OF GROUP 3**

The use of condensers in the usual tuned circuits and filters has been discussed previously. The following table gives the impedance of the condensers when the frequency is varied.

<table>
<thead>
<tr>
<th>Frequency (cycles)</th>
<th>Impedance (ohms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>99.7</td>
</tr>
<tr>
<td>100</td>
<td>99.6</td>
</tr>
<tr>
<td>200</td>
<td>99.3</td>
</tr>
<tr>
<td>400</td>
<td>99.1</td>
</tr>
<tr>
<td>800</td>
<td>98.9</td>
</tr>
</tbody>
</table>

**MISCELLANEOUS APPLICATIONS**

When a condenser is being charged or discharged through a resistance, it is necessary to change the circuit at the end of each time interval. The charge must be made so long that there is no appreciable discharge during one cycle of the modulation frequency. A time constant of 1/10th of a second is often used in this circuit.

![Table II](image-url)

**RADIO DESIGN PRACTICE**

**DEVELOPMENT**

Designs, dimensions and characteristics of components and assemblies—essentially the data required by those who design and build radio and associated equipment—have been brought together in an idea book. It was conceived in recognition of the fact that useful information is not available at one's disposal.

The editor has selected representative systems, those needed for any given application. The dimensional drawings and constants are invaluable in planning and assembling. The book has a large spiral binding, and published an enormous mass of useful data for the busy radio designer. The book has a large spiral binding, and published an enormous mass of useful data for the busy radio designer.