stantial impedance to fluctuation in current (in particular, to increases in current) and thereby occasion a momentary drop in voltage. A full explanation of how the instantaneous voltage can be greater than its source would involve too deep a delving into a.c. phenomena, and for present purposes it must suffice to say that the cessation or lessening of the current through an inductance results in the inductance giving up some of its stored energy in an effort to maintain the current at its former value; this energy appears in the form of a momentary increase in voltage over and above the voltage available at the source. A little more will be said on this subject in dealing with the pentode.

(This article will be continued in our next issue, when "Cathode" will deal with the actual task of calculating power output.)

Blocking Condensers

A.C. Resistance

AN ordinary wire-wound anode resistance, rated at, say, 20,000 ohms, is a hard path for any current to pass through. Even if the wire of which it were wound could carry it, it would take an electrical pressure of 20,000 volts to drive a current of one ampere through this component. Its resistance would be about the same for alternating as for direct current.

A fixed condenser, however, will not pass direct current, although it will offer a path to alternating currents, and the higher the frequency of the alternating current the lower the resistance a condenser of a given capacity will offer, and the larger the capacity of the condenser the lower its A.C. resistance.

These are facts the constructor should bear in mind. It would be no use using a .0002-mfd. fixed condenser in connection with a loudspeaker by-pass shunt. The effective A.C. resistance such a component would offer to a frequency of 1000 is somewhere around eight megohms. For such work a condenser having a capacity of 2 mfds. is generally specified, and, at the same frequency, its effective A.C. resistance would be only 80 ohms (this is small in comparison with the resistance of the average type of loudspeaker).

For the .0002-mfd. fixed condenser to assume an effective A.C. resistance of 80 ohms the current handled would have to have the frequency of a million cycles, and this is not a low frequency, but a radio frequency such as is encountered when 2LO is tuned in (at this frequency the 2-mfd. condenser would offer an impedance of a mere 1-12th of an ohm.)

CONDENSERS of the 2-mfd. order are frequently used as H.F. shunts or by-passes. A 2-mfd. condenser is often connected from the "priming" grid of an S.G. valve to earth, and, as you can see, it offers a very short-cut to H.F. currents. The resistance of the H.T. battery might be 100 or 200 ohms, but not much H.F. would reach this while there is an alternative path available of only 1-12th or so of an ohm in resistance.

And regarding condensers, comparatively recently the electrolytic variety has become available for general use. The electrolytic condenser is a remarkable device in that it achieves an enormous capacity with remarkable compactness. An electrolytic condenser rated at 2000 mfds. will be only a matter of a few cubic inches in size.

The Electrolytic Type.

IN principle it is something like a battery that has no depolarising agent. When a voltage is applied across its two terminals, thin films of gas are formed across the plates that are immersed in the chemical solution. The plates and the electrolytic solution act as do the plates in an ordinary condenser, while the thin film of gas forms the dielectric. And it is because the gas film is so thin that the great capacity is obtained.

You will notice that it is by the application of voltage that the gas film is formed, and that therefore this type of condenser cannot be used purely for A.C. work. A steady potential must be applied for the device to function. It can, of course, deal with alternating currents that are superimposed on D.C., such as are met with across the output terminals of an L.T. unit, but the A.C. must not exceed a certain proportion of the total current.

Electrolytic condensers are most effective as smoothers of irregularities in L.T. supplies. Here one often meets low-pitched hums of the order of 120 or so cycles. At this frequency an electrolytic condenser of 2000 mfds. will have an A.C. resistance of only two-thirds of an ohm, while its resistance to pure D.C. will be at least a thousand or two ohms.

You may be surprised that these devices have resistances of such a character and not of almost infinity, as in the case of the ordinary type of condenser, but you must remember that it is, as its name implies, of an electrolytic character!

AT a frequency of 1000 cycles, such as one might come across in the commutation ripple of D.C. mains, the 2000-mfd. electrolytic condenser will have an A.C. resistance of about 1/12th of an ohm, and its resistance to frequencies of the order of 3000 cycles will drop to 1/40th of an ohm. These are remarkably low resistances in comparison with the resistance of a filament circuit, which will at least be of the order of tens of ohms.

Thus when the current irregularities divide between the two paths that constituted by the by-pass condenser and the other by the filaments of the valve, the proportion that flows through the latter is dropped to a negligible degree. Meanwhile the D.C. flows through its usual channel in an uninterrupted manner.

It is interesting to note that the resistance of the 2000-mfd. electrolytic condenser to a radio frequency of a million will be about a thousandth part of an ohm, but, of course, there are no duties to be found for a component of that nature on the purely R.F. side of a receiver.

IF you experiment with reaction control when the local station is on not only do you interfere with other people's programmes but the powerful transmission of the local station prevents you from hearing the exact effect of the reaction increase. Always choose non-broadcasting hours for such tests.

RADIO DIRECTORY

What to Buy and Where

CITIES

AERIAL MASTS	Domestic Radio Co., Ltd., 300 Queen Street, Auckland.
ALTONA & HAMMARLUND-ROBERTS SETS.	Johns, Ltd. Chancery Street, Auckland.
AMPLION LOUDSPEAKERS	All Radio Dealers.
BURGESS RADIO BATTERIES,	All Radio Dealers.
CROSLEY RADIO RECEIVERS	G. G. Macquarrie, Ltd., 120 Willis Street, Wellington.
CROSLEY RADIO	Abel, Smeeton, Ltd. Rep.: G. MOSES. James Street, Whangarei.
CROSLEY RADIO	Abel, Smeeton, Ltd., 27-29 Customs St. E., Auckland.
EMMCO RADIO PRODUCTS	Johns, Ltd., Chancery St., Auckland.
EMMCO RADIO PRODUCTS	Thos. Ballinger & Co., Ltd., Victoria St., Wellington.
EMMCO RADIO PRODUCTS	L. B. Scott, Ltd., Worcester St., Christchurch.
KING RADIO RECEIVERS	F. J. W. Fear & Co., 63 Willis Street, Wellington.
LISSEN RADIO PARTS AND KITS	All Radio Dealers.
LOUDSPEAKER AND TRANSFORMER REPAIRS	A. E. Strange, 404 Worcester Street, Christchurch.
MAJESTIC RADIO RECEIVERS	Kirkcaldie & Stains, Chief Wellington Agents, Lambton Quay.
MULLARD VALVES	All Radio Dealers.
PILOT 1930 PARTS AND KITS, ETC.	Abel, Smeeton, Ltd., 27-29 Customs Street East, Auckland.
PILOT 1930 PARTS—PILOT SUPER WASP KITS, GILFILLAN, KELLOGG and ATWATER KENT SETS	Harrington's, N.Z., Ltd., 138-140 Queen St., Auckland. 40-42 Willis St., Wellington.
RADIOLA RECEIVERS and Expert Radiola Service.	Farmers' Trading Co., Ltd., Hobson Street, Auckland.

COUNTRY TOWNS

CROSLEY RADIO	J. C. Davidson, Main Street, Pahiatua.
CROSLEY SETS	Abel, Smeeton, Ltd. Rep.: C. Rusden. 409 Devon Street, New Plymouth.
CROSLEY RADIO	D. A. Morrison & Co., Victoria Avenue, Wanganui.
MAJESTIC, ATWATER-KENT AND RADIOLA ELECTRIC SETS	Radio House, Hamilton. G. S. Anchor, Manager.
PHILIPS VALVES AND APPARATUS	All Good Radio Dealers.