

New Points For Listeners and Dealers-- By "Meter"

The aim of this section is to give listeners information of new and interesting devices and sets on the local market. It is free of advertising intent or influence and to the best of our ability will convey only absolutely reliable statements. Names, prices and sources of supply are mentioned for the benefit of readers and to save individual inquiry.

IN a recent number of "The Proceedings of the Institute of Radio Engineers of Great Britain" is an excellent paper entitled "Service of Broadcast Receivers," by L. Manley and G. E. Garity, of the Radio Corporation of America. This paper comprises, in effect, a very exhaustive set of instructions for the inspection of radio receivers and for the diagnosis of defects and failures of all kinds. The paper is so long (it covers 25 pages) that it is impossible for me to give more than the very briefest account of the ground which it covers.

The failure of receivers is classed broadly under the following heads: "Lack of Operating Experience on the Part of the User," "Location," "Defective Accessories," "Open Circuit," "Short Circuit," "High Resistance Connection."

It is interesting to note the author's suggested list of tools and apparatus which should be possessed by anyone undertaking the inspection and care of receivers. The list is as follows: Set of tested valves, multi-scale voltmeter of good quality, pair of headphones, large and small screwdrivers, small soldering iron, solder and non-corrosive flux, spare wire and tape, test leads with clips, pipe cleaners, large piece of cloth, set of high-tension and grid-bias batteries (small).

APPLICATION OF OSRAM SCREENED VALVE.

MR. L. H. Wright, radio specialist, 153 Willis Street, Wellington, gave me a practical demonstration, the other evening, of the application of the Osram new screened-grid valve. Mr. Wright had built one of these valves into a four-valve broadcast receiver. The circuit embodied one stage of tuned radio-frequency employing the new valve in that position, with the usual detector and two stages of standard transformer-coupled audio-frequency amplification. The circuit included fieldless binocular coils, and regeneration was obtained with a variable condenser. Thus there were three condensers for control—one for the aerial circuit, one for the secondary circuit, and the other for regeneration. The last-mentioned gave exceptionally smooth and gradual control of reaction. The installation of the screened grid valve had been carefully followed out according to the manufacturers' instructions. The valve which is sold with the necessary holders (or supports) was fitted horizontally. One half of the valve lay inside the aluminium-shielded stage of radio-frequency, and through a neat circular hole in the side-wall of aluminium the valve projected towards the detector valve of the set. It will, therefore,

be observed that only one half of the Osram screened-grid valve lies within the shielded portion of the set. This is strictly according to the Osram people's instructions. Mr. Wright's set was connected to my aerial, and was immediately bringing in the Australian stations with astonishing volume and clarity free from any parasitical noises. It was manifest that the new screened-grid valve was accomplishing the work of at least two ordinary stages of radio-frequency, if not three stages. I think a word of praise is also due to Mr. Wright, who is a young Englishman, for his neat adaptation of the new valve to a circuit which embodied some of his own innovations. I can strongly recommend all dealers to get acquainted with the new screened-grid valve as it is going to be a big thing in radio.

RESISTANCE-CAPACITY COUPLING.

RESISTANCE-CAPACITY coupling for low-frequency amplification has become deservedly popular, and is, in fact, increasing in popularity, partly owing to the development of suitable valves, and partly to the purity of reproduction, which is obtained with this system when suitable valves are available.

So much has been said in praise of resistance-coupling that many experimenters are apt to take it for granted that resistance-capacity coupling is perfect, and that no distortion or other troubles can possibly arise when it is used. It is not, however, always so efficient in practice as it may appear in theory, and there are some points which ought to be watched carefully.

It should be noted, that the amplification obtainable per stage can never exceed the amplification factor of the valve. It therefore follows that a valve with a high amplification factor is desirable, but unfortunately such valves generally have also a high impedance, which is a disadvantage. An ideal valve for this purpose would be one with a high amplification factor and yet with a low impedance; in actual practice available valves represent rather a compromise.

Valves specially designed for resistance-capacity coupling can now be obtained having amplification-factors ranging from 35 to 50, and with impedances of 70,000 up to as much as 200,000 ohms. The total amplification obtainable depends also upon the resistance in the plate circuit. This must be fairly high, but it should not be so high as to cause too serious a drop in the voltage applied to the plate.

MELBOURNE DEALERS COMBINE.

THE Radio Dealers' Association of Victoria held its inaugural meeting in Melbourne the other day. There

were present 130 Melbourne city and suburban radio traders. The objects of the association are: "To watch over and protect the general interests of its members; to collect information and disseminate same to members; to use every means in its power for the removal and redress of grievances; to promote the progress and trade of the radio trade in general; to form a code of rules and practice for the efficient carrying out of its objects, and to simplify and facilitate the conduct of business; to arbitrate on all matters submitted for dispute and record decisions for future guidance, and to obtain such conditions by united action as would be impossible or more difficult to achieve by individual effort."

NEUTRALISING A BROWNING DRAKE.

THE neutralising of a Browning-Drake set is an operation which puzzles many amateur constructors. When all connections have been made, turn on all the rheostats and place the reaction so that it is just on the "raw edge." Now, using the receiver and unit dials, tune in a strong transmitter, say 2YA, Wellington. Remove the negative filament wire joined to the radio frequency valve socket. You will still hear 2YA working. Take a long stick suitably shaped, and turn the screw in the neutralising condenser until the signals are cut right out or nearly so. You will find the correct point quite marked; going beyond either one way or the other immediately increases signal strength. Now replace the filament negative wire, and tune in stations in the ordinary way, using the unit and receiver simultaneously. Once the balancing has been effected correctly, it should not be altered unless you use a new radio frequency valve, when the method given above should be repeated.

A NEW POWER AMPLIFIER.

A NEW power-amplifier valve, which has a far greater output than any valve previously designed for reception purposes, has recently been developed. The valve is known to the radio trade as the 250 type and it has a maximum output of 4650 milliwatts; that is to say, the 250-type valve is capable of delivering more energy than two 210-type valves connected in a push-pull circuit, or it can produce 6.6 times as much undistorted output as a single 171 type and three times as much as the 210 type. The valve has been designed primarily for use in conjunction with auditorium loudspeakers where enormous volume is required; and it may be used for the operation of a plurality of loudspeakers in hospitals and exposition work where a number of reproducers are supplied with energy from a common amplifier. Also, it is ideal for use in a roomy home; as the valve may be operated with low potentials at only a fraction of its

maximum output. In this way it is possible to insure ample reserve power, thus guaranteeing distortionless output at all times.

The chart below shows the electrical characteristics of the 250-type valve for various values of plate voltage:

	250	300	350	400	450
Plate voltage	250	300	350	400	450
Grid voltage	45	54	63	70	81
Plate current (M.A.)	28	35	45	55	55
Plate resistance	2100	2000	1900	1800	1800
Mutual conductance	1800	1900	2000	2100	2100
Amplification factor	3.8	3.8	3.8	3.8	3.8
Output (Milliwatts)	900	1500	2350	3250	4650
Filament voltage	7.5	7.5	7.5	7.5	7.5
Filament current	1.25	1.25	1.25	1.25	1.25

In size the new valve is considerably larger than the 210 type (6½ inches in height and 2 11-16 inches in diameter), but it is mounted on a standard UX-type base.

The filament is of the rugged oxide-coated ribbon type, which operates at a dull red heat. The current for heating this is usually obtained from a 7½-volt winding of a power transformer; and the design of the transformer should be such that, with normal line variations, the voltage applied to the filament is maintained within 5 per cent. of the rated value. The plate of the valve is blackened, and is tall and narrow, as in the 281-type rectifier.

In operation the new valve should preferably be mounted in a vertical position, and provision should be made for sufficient air circulation (natural) to prevent overheating. Because of the high plate voltages used the power supply should always be turned off when the valve is inserted or removed from the socket, or when adjustments are to be made.

By using low plate voltages the life of the valve may be greatly increased; and this is always recommended where the volume requirements are such that the maximum output of the valve is not essential. A plate potential of 350 volts permits greater output than is usable in most installations. In cases where maximum plate voltage is used, the receiver design should be such that, even during the maximum expected line-voltage variations, the plate voltage will not exceed 450.

When deciding upon the plate voltage to be used it should always be remembered that the use of a high potential does not in itself appreciably increase the volume, but only allows greater volume without distortion. Also, it should be remembered that, when operating the valve at maximum voltages, the plate of the valve should be frequently observed. Plate temperatures exceeding a dull red heat indicate an excess of plate current, which may be caused by an overload of plate voltage or insufficient grid-bias voltage. Always, when operating this valve, it is essential to make sure that the grid-bias potential is of the correct value for the plate voltage used. It is also necessary to make sure that a coupling device (output transformer) is connected between the plate circuit of the valve and the loudspeaker.

BROKEN-DOWN TRANSFORMERS.

ONE of the most common faults which may develop in a receiver after a period of use is a breakdown in the primary winding of the audio frequency transformer. The fault generally manifests itself in the form of crackling noises in the loudspeaker, which gradually increase in intensity, until the wire definitely breaks, when signals cease completely. Often by leaving the receiver switched off for a while the two ends of broken wire meet again, and on switching on the same cycle of events occurs.

If these are the symptoms, the dealer who is called upon to diagnose the trouble may well commence by testing the transformer primary (or both, if there are two audio frequency transformers). It is rarely the secondary which breaks down, since this winding normally carries no current. On the other hand, the primary carries the plate current of the preceding valve, which in time may cause a breakdown in the case of cheap transformers with fine wire primaries. Even some expensive instruments are by no means immune from the trouble.

The primary winding may be tested for continuity in many ways, including a battery and a pair of 'phones or a neon lamp indicator. Naturally a battery and small pocket lamp bulb will not do, since even if the winding is continuous, its resistance is too high to pass enough current to light the lamp. With a small battery and a pair of 'phones, wired in series with the primary of the transformer, a loud click should be produced when making and breaking the circuit. Even if the winding is faulty, a slight click may be noticed, due to the charging up of the windings, but it will not be sufficiently loud to be confused with the click that is due to a continuous winding.

While we here in New Zealand are contemplating an influx of batteryless sets, English papers report a new invention in batteries. Patents are being sought in Great Britain on an interesting form of accumulator battery, intended mainly for wireless work. The new feature of the battery is a device which obviates the need for periodical inspection to replace water lost by evaporation, and "gassing" when the battery is on charge. It depends on the fact that the "gassing" arises from the electrolysis of the water in the battery, and the consequent release of hydrogen and oxygen in the form of gas bubbles. If suitable means of igniting the mixture of the two gases in the top of the battery could be found they would recombine as water, and drop back into the battery. The patent covers a device for igniting the gases as they are released from the battery. The cells of the battery are tightly sealed so that evaporation is prevented. Attached to the top of each is a device resembling a motor-car spark plug, with which is associated a small spark coil. As the battery begins to "gas" the gas pressure in the top of the cells rises until, when it reaches a prearranged pressure, a switch is automatically closed, and the spark coil produced a spark in the top of each cell, igniting the gases and causing them to recombine into water. It is proposed to apply the same device to rectifiers used in various forms of battery chargers and eliminators to overcome the need for supervision.

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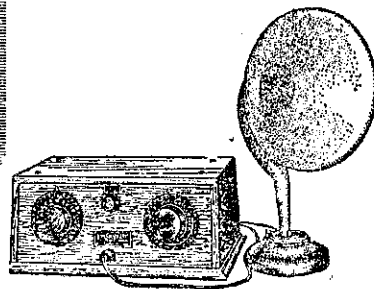
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