Cutting Current Consumption in the Portable

THE small size of the "B" batteries which can be accommodated in a portable receiver renders the problem of reducing the drain on them one of importance. An apparently small reduction in consumption will frequently mean quite a pronounced increase in the life of these small batteries, owing to the fact that the impracticability of rapid depolarisation makes them uneconomical for any considerable discharge rate.

Not much can be done in the direction of reducing the consumption of the last stage, since the successful operation of a speaker is dependent upon a fair current through the power valve. However, one can at least experiment with a slight increase in bias over that normally used, and it will not infrequently be found that the consumption of the stage can be reduced to 5 or 6 milliamps without unduly affecting the quality of the output. It is possible, by using a push-pull final stage, to reduce the steady current to about 1 milliamp, this increasing automatically to accommodate loud passages. The valves are biased down to the centre of the curved portion of their characteristic curves, the push-pull arrangement still permitting operation without distortion. However, the adjustment must be rather precise and an output transformer or choke is practically a necessity, so that not every constructor will feel disposed to use two valves in this manner.

The first audio stage, if one is employed, may also be overbiased a trifle, though not so much as to introduce distortion. With 120 volts B supply most valves can be biased to at least 4½ volts negative without any perceptible effect on results.

The commonly-used grid rectifier necessarily receives a positive bias. Something can be done, however, by reducing the "B" voltage applied to the plate of this valve, either by tapping lower down the battery, or, better still, by interposing a resistance of about 50,000 or 60,000 ohms in the feed line to this particular valve.

The high-frequency valves, if of the ordinary three-electrode type, may receive a negative bias of 3 or 4½ volts; stop short of sacrificing amplification, however. The screen-grid valve now more usually used for high-frequency amplification is normally used without any negative bias, under which conditions it draws about 4 milliamps. Its high amplification factor renders it unsuited to the application of too high a negative bias, but if a 1½-volt flashlight or other cell is provided to bias this valve, a distinctly worth-while reduction in current from 4 milliamps to 1.5 milliamps per valve will be effected, without any loss of amplification.

If these precautions are observed, it is usually a fairly easy matter to keep the current consumption of a four-valve portable under 10 milliamps, a current which most of the small batteries suitable for portable work are capable of readily providing. In constant use, a life of about three months may be expected from these smaller-sized batteries with the drain mentioned, so that, considering how cheaply the batteries may be bought, the cost of the current cannot be deemed excessive.

Underground Antenna

Proof of Inefficiency

IN localities where the erection of an aerial is impracticable or impossible, and where an indoor antenna is undesirable, somewhat mediocre results may be obtained from a powerful receiver by the use of what is known as a "ground" aerial. This consists, in the main, of a wire buried underneath the surface of the ground, and well-insulated from the earth which surrounds it.

The resulting reception is very poor, and nowise justifies the grossly exaggerated claims made by several American firms marketing a device known as an "earth antenna," an apparatus which is stated to function efficiently as an aerial while buried underground. In view of this, it is interesting to note the proceedings taken by the American postal authorities against some six companies who were marketing these devices per medium of the post.

The following facts developed by the Postal Department serve to illustrate the type of advertising favoured by these companies. "It has been found that certain companies are obtaining remittances of money through the mails upon representations to the effect that for such remittances they will furnish a so-called underground antenna; that when used with radio receiving sets as directed, such antenna causes a miraculous reduction in static and noisy interference and gives clear-toned reception on every station which can be found; that such device is the 'latest step' in radio progress; and that the price of the device will be refunded at once, in full, to purchasers thereof who find the same unsatisfactory and return it."

A so-called "earth antenna," together with the directions for use, were obtained from the promoters of the enterprise by the post office inspector who investigated this case. The device itself is cylindrical in shape, approximately thirteen inches in length and four inches in diameter, and is encased in cardboard at the sides and bottom. The top is sealed with a tar-like preparation, from which protrudes a wire approximately thirty-two inches long enclosed in a lead cable. Attached to the outside of the device and running its entire length is a metal bar one half-inch in width and approximately 1-64th of an inch in thickness. Inside the device is a hollow core about which are wrapped a number of windings of ½in. metal tape.

The earth antenna and the directions were forwarded to the United States Bureau of Standards for examination and report. An exhaustive series of tests was conducted over a period of three weeks with the assistance of various instruments for measuring with scientific accuracy the results obtained.

A report covering the results of these tests prepared by the expert was offered in evidence at the hearing and in addition he himself was present and testified. His testimony shows that the signals obtained by use of the earth antenna are inferior in strength to those secured from a vertical aerial in the ratio of from one to one hundred to one to several hundred. Results secured through use of the earth antenna were inferior in strength to those obtained by use of an ordinary two-inch pipe driven four feet into the ground in the ratio of one to fifteen.

According to the statements of this expert, while it is true that a certain reduction in static is obtained by use of the earth antenna, a directly proportionate reduction in general reception is concomitant thereto. Static was in fact present during certain of the tests when no other sound was audible. He stated in effect that any results whatever obtained from use of the earth antenna are due to the fact that it acts in some slight degree as a grounding device.

He further stated that while in some instances, due to improper installation of overhead aerials, lack of proper tuning of the set or similar factors, use of the earth antenna may seemingly cause an improvement in reception, the fundamental fact remains that in passing through the earth electro-magnetic waves are greatly attenuated.

Summarising his testimony, the expert stated that the earth antenna does not cause a reduction in static and noisy interference; it does not give "clear-toned reception" on every station which can be found or cause any kind of broadcast to be more faithfully reproduced; and it is not the latest step in radio progress.

As a result of the proceedings instituted, a postal fraud order was issued by the Post Office authorities against the six companies involved. The above case should dissuade any radio amateur from installing a ground aerial in the hope that static will be reduced and reception improved.

A Request

I NOTICE that you have never printed a list of the Australian amateur radio transmitters like the much-appreciated list of New Zealand amateurs which was printed in the June 28.

Could you publish a list of the Australian amateurs or advise where I can obtain one? I notice also that you are printing lists of B class stations in New Zealand, and next week will be printed lists of stations heard in New Zealand. Well, I am sure these are and will be much looked forward to by the longwave DX. hunter, but these persons should have purchased a "Listeners' Guide" with the necessary information in it. If it is impossible for the VK amateurs to be published could you tell me of a book that could be bought with the required data in it?—D.McW. (Westport).

(A list of Australian amateurs would involve more space than warranted. They are given in "Radio Amateur Call Book," September, 1929, obtainable from Te Aro Book Depot, Wellington. A full list of broadcast stations was published in "All About the All Electric.—Ed.)

ALL sorts of messages are received by broadcasting stations. An American station acknowledges the following telephone call, which at first greatly puzzled and then amused the technicians: "Say, mister, your station is playing too fast. How can I slow it down on my set?"

(See page 32.)