

Facts about "A" Battery Eliminators



THIS is a brief review of several systems of A battery elimination that may be successfully adopted provided that essentials are supplied in a suitable way.

At the outset it is well to explain why the problem of eliminating the A battery is a greater obstacle to overcome than is the elimination of the B battery. In the case of the latter, the current to be supplied to the average set is about 30 milliamperes or .03 ampere (three hundredths of an ampere). A comparatively small current such as this, though of a voltage near 200, is easily smoothed by suitable chokes and condensers of comparatively small capacity. The consumption of plate current in a receiver cannot be great, owing to the high internal resistance of the valves caused by the space between plate and filament which has to be traversed by the current.

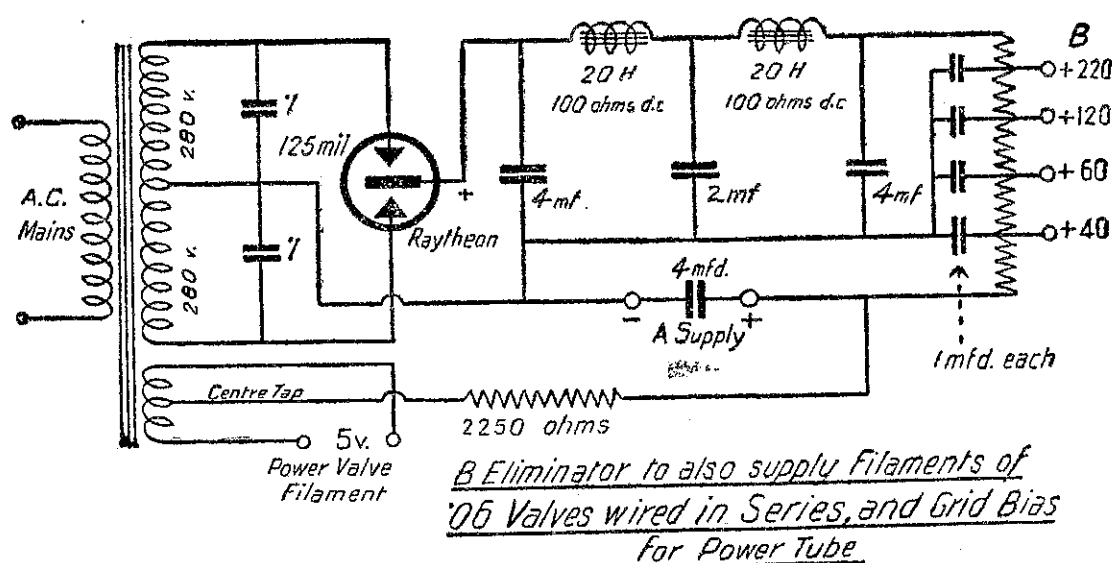
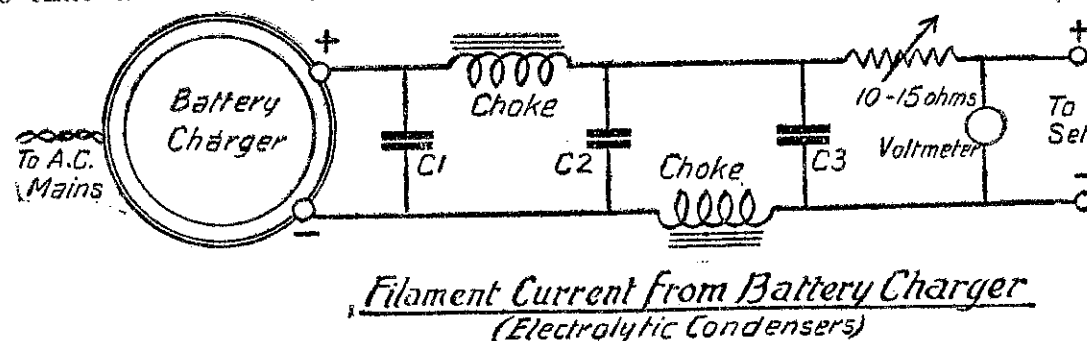
WHEN we come to filament supply the question is very different, as the amount of current to be smoothed is many times that required in the plate circuit. The 201A valve requires a quarter-ampere for its filament, so that a receiver with five such valves requires $1\frac{1}{4}$ amp. at 6 volts to operate its filament. The minimum amount of current available, allowing a margin, should therefore be $1\frac{1}{2}$ amperes. Many valves are now in use that require only .1 amp. or .06 amp. for the filament. Five of the former would only require a total of half an ampere, whilst five of the .06 type would only consume one-third ampere. The foregoing figures are for the usual method of connecting up the filaments in parallel.

Filaments Run from B Eliminator.

A SYSTEM of running both A and B supply (and sometimes C also) from a B eliminator containing a 125

milliampere Raytheon tube has been successfully developed by employing only .06 valves and connecting all the filaments in series. In such a case the amperage of every valve must be the same, and the amperes consumed will be that of one valve, in this case .06

long as a voltage equal to the total is applied. There is some disadvantage in this system owing to the restriction placed upon all but the last valve. A power valve of any filament rating may be used in the last stage by heating its filament with raw A.C.



current from a filament winding on the eliminator transformer. Arrangements are made in the eliminator whereby the 15 volts or so required for the filaments is drawn off separately through suitable resistances. Suitable resistances are placed across each filament to pass the added plate current when this is sufficient to take into account.

Smoothing Arrangements.

AS mentioned above, a current of at least one ampere, and probably more, has to be filtered and smoothed for use with parallel connected filaments, this arrangement obviating any alteration of the wiring in the receiver. Condensers of two and four microfarads capacity are totally inadequate to handle the required current, and the advent of the improved electrolytic condenser makes A elimination a much easier problem, and allows of even a small balancing accumulator being dispensed with. There are now on sale in the United States, "filter blocks" specially made for A elimination, and these contain two electrolytic condensers and suitable choke coils (Tobe Co.).

Abox, Aerovox, Dubilir, Elkon and Tobe Companies also make suitable electrolytic condensers, some being practically dry.

Some of the most recent type of condenser make use of the oxide film which forms on aluminium, as the sole dielectric and means being taken to prevent the formation of the gas dielectric film, a large increase in capacity for given area is the result.

Such a condenser, in two sections, may have a capacity of 1800 microfarads in one section and 3800 in the other, or a total of 5600 microfarads in a space of $5 \times 5 \frac{1}{2} \times 1 \frac{1}{2}$ inches! The breakdown value of such a condenser is 50 volts, so it is well suited to smooth out filament current.

Whilst a total of about 16 microfarads may form the condenser outfit of a B eliminator, a capacity of some thousands of microfarads is necessary to smooth an A supply.

In early attempts to make high-capacity condensers, lead sheets were separated by wood-pulp paper kept moist with acid solution, but as the capacity of a condenser varies inversely as the thickness of the dielectric and directly as the area of the plates, efforts were made to reduce the separation to a minimum, because enlarging the size of plates meant great bulk and extra cost.

Thus the ultimate form of condenser was the electrolytic type, in which a very thin film of gas on the condenser plates acts as the dielectric to separate them from the liquid which acts as the opposite set of plates. Condensers of this type are now manufactured, varying in detail, but having a capacity of thousands of microfarads.

Either one or two chokes must be utilised in addition to the smoothing condensers in order to suppress any ripple that may be present in the current. Great care must be taken in designing such chokes, as no great voltage drop is permissible across them. The d.c. resistance must therefore be kept low, and this is effected by employing a heavy gauge of wire. As the inductance of such a choke need only be a quarter henry or less, the number of turns of wire need not be very great, and will not exceed a few hundred. By not unduly reducing the cross-section of the core, the number of turns, and thus the d.c. resistance, can be kept low. In addition to low d.c. resistance, the wire must be capable of carrying two amperes, but this does not present any difficulty.

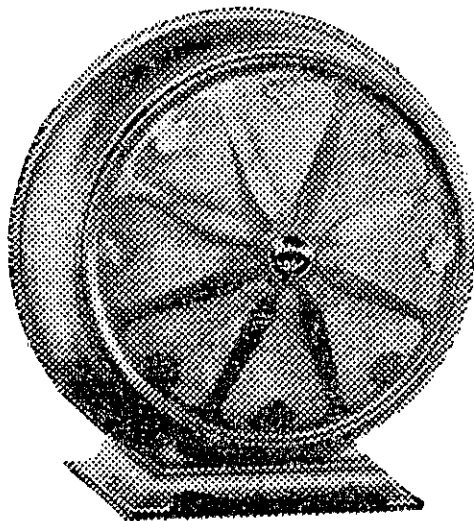
Filament Current From Battery Charger.

PERHAPS the simplest way of producing an A eliminator is to employ a valve rectifying charges of suitable capacity, say 2 amperes, connecting this to electrolytic condensers, and one or two low inductance chokes. Nothing more is required except a 10 or 15-ohm power-type rheostat and a voltmeter reading to 8 or 10 volts. Two condensers are sufficient for the average receiver, but a good home-constructed set with low-note amplification will probably require three. The circuit is shown in a diagram.

Another method, obviating the use of electrolytic condensers, is to place two wet batteries across in place of C1 and C2. Small dry-cells have even been used for this purpose, but are not so satisfactory as accumulators. The operation of this system depends on the fact that, at voltages equal to the cell voltages, the resistance across the cell banks is very high, so that practically none of the current flows through them, but continues to flow out through the filter circuit to the receiver. But for all current whose

Before you decide

The ...
BALDWIN
"VITAPHONE"



The Baldwin "Vitaphone" is especially attractive, sensitive, and powerful and is an entirely new and advanced principle of design and construction, employing a fully shielded case and electrically filtered reproduction.

Write for Illustrated Leaflet from—

THOS. BALLINGER & CO., Ltd.

58-62, VICTORIA STREET, - WELLINGTON.

"Where the Quality Goods are Sold."