

Experiments with the S.G.

A Reader's Experience

FROM experiment I have found that the screen grid valve is the most efficient valve for the radio frequency stages of the Browning Drake.

The two advantages I find it possesses are: (a) greatest amplification; (b) no necessity for neutralisation.

I gather that the great objection to the screen grid valve is its high impedance—usually about 200,000 ohms, whereas the normal impedance of a slot wound Browning Drake primary is about 15,000 ohms. At such a discrepancy as this the screen grid valve would undoubtedly be unsatisfactory. The solution of the problem is not, however to be found in discarding the valve, but in adjusting the primary.

For experimental purposes I had a regenerative wound with a split primary, having an average impedance of approximately 50,000 ohms. I then tried various valves in front of it, viz., 609, 201A, 630, 635, 200a, PM6D, and screen grid. The screen grid proved to be the best, being fully 20 per cent. better than the 635, which was the best of the rest. The screen grid was, of course, connected across the whole primary. I used no shielding at this stage, and there did not appear to be any trouble. Selectivity was quite as good as with any of the other valves, and better than with the 609 and 630.

I next decided to add a further stage of radio frequency, and for this purpose I had a radio frequency transformer wound with split primary as before. This radio frequency transformer I shielded with a copper can. Again I found the best valve to be the screen grid. Selectivity with the two stages is just rather too sharp for long-distance work—in fact, the set is quite as sharp as a short-wave set.

As a result of the experiments I am satisfied that the screen grid valve can be made eminently suitable for the Browning Drake circuit, provided the primaries are wound to a maximum impedance. It is not to be expected that the full amplification factor of the valve will be obtained, but it is a simple matter to obtain a factor considerably in excess of that of any three electrode valve.

I propose to experiment with a slot wound primary, having the same number of turns as the secondary.

Another matter of interest is that I am still using the standard grid leak to filament negative, and it is going so well that I have not bothered to try a positive return. I am also trying the result of applying reaction to the screen grid valve by putting a condenser between plate and grid. Indications are to the effect that such an arrangement will be advantageous, but I have not yet completed the experiments.

BEFORE continuing some further screen grid experiments, I am wanting some more information on impedance, and perhaps your technical editor could give me some advice on the following points:—

(a) If a primary coil at a certain frequency has an impedance of 50,000 ohms what would be the effect on impedance of applying parallel feed to this primary? Condenser .5 and efficient choke.

(b) Will the application of reaction either increase the impedance in the plate circuit or decrease the internal impedance of the valve.

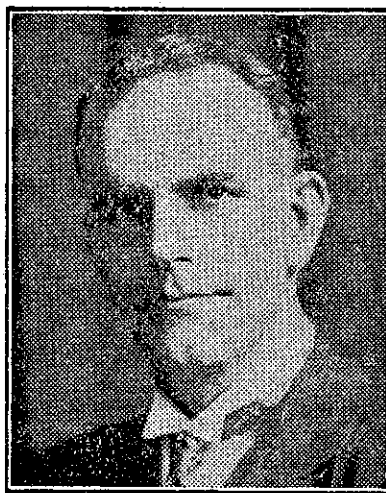
(c) Why is the grid leak recommended to be connected for filament positive in the screen grid circuit.

(d) What is the maximum number of turns possible in a slot wound primary? Is there a maximum? What would be the effect of increasing the primary turns beyond the number of the secondary and why should it have that effect?—"Diogenes" (Cromwell).

IT will be noted that when a large number of turns are used as a primary the amplification on the

higher frequencies is reduced for the portion of the coil in which currents are in quadrature is appreciable, and hence the voltage at the grid of the following valve is reduced. After a given number of turns there is no increase in the amplification. Past this further selectivity is impaired. It is generally conceded that this number should not exceed 20 on a three-inch coil.

Re the application of reaction to the s.g. valve through a condenser between the plate and the grid. The same pur-



MR. F. E. SUTHERLAND,
who controlled the fourth Test last
Saturday.

—Andrew, photo.

pose would be served if a 0-100,000 ohm resistance is placed in the screen circuit. This arrangement would probably be better. Concerning the queries when a circuit consists of two or more branches in parallel, as in this case, the total amount of energy in the circuit cannot be obtained by calculating the branch currents and adding them because of the difference in phase of the various branch currents. The situation is further involved because of the possibility of resolving this fluctuating current into a smooth direct current, modulated by a variable frequency alternating potential.

Unfortunately, however, when resistances of the proper value to give us adequate control of the phase angle are employed, it will be found that any variation of the resistance varies the plate voltage applied to the valve, and may seriously effect the amplification obtainable. In order to avoid this a comparatively low inductance, (R.F.C.) should be shunted across the resistor, thereby ensuring a maximum static value of plate voltage at the valve while offering a very high impedance of radio frequency currents. This resistance can now be varied without affecting the static value of the plate voltage, and will be found to serve

Auckland Notes

(By "Call-up.")

PART of the organ recital given by Mr. Maughan Barnett, city organist, in the Town Hall last Sunday, was relayed by 1YA, and the innovation proved so popular that it has been decided to relay these organ recitals regularly until the contract with the Auckland City Council runs out next spring.

A BAND which few listeners have heard, and which has not previously broadcast, will be heard from 1YA on August 27. This is the Birkenhead Municipal Band, which has earned a considerable reputation as a first-class combination.

AMONG new vocalists to be heard for the first time from 1YA in the near future are Miss Mira Monk, soprano, August 24; Mr. S. Hislop, base baritone, August 27; Mr. Peter Baxter, English baritone, August 29; and Mr. Arthur Simpson, August 30.

STATION 1YA hopes to give another "New Zealand Night" at an early date, but is finding some difficulty in obtaining suitable instrumental numbers by New Zealand composers. There is no dearth of songs, while part songs are also available. This programme should be presented some time in September, just a year since the first such programme was presented from the station.

STATION 1YA is now four years old, having been on the air since August 7, 1926. It was the first station to be opened by the Radio Broadcasting Company, and was specially built for its purpose. At the time of its opening there were only 4400 licensed listeners in New Zealand, whereas now there are well over fifteen thousand in the Auckland province alone.

RECENTLY a batch of fifty-two persons appeared at the Auckland Magistrate's Court charged with using unlicensed radio receiving sets, and all were fined. A week later another batch of sixteen appeared on similar charges and were fined from £1 to 30/- and costs. One woman who was charged said the set in question belonged to her son, and that he had only paid 1/- for it. Well, it will cost you a pound now," remarked the magistrate dryly, while the clerk of the court added further to it by saying "Ten shillings costs."

very nicely as an oscillation control. Also, if provision is made so that it can be reduced to a low value so as to effectively short-circuit the .5 mfd., it can also be employed as a volume control for the receiver.

(b) The impedance—change in plate voltage divided by the corresponding change in plate current.

(c) Being without gas, the filament return of the screen grid valve is to positive.

(d) This has been covered by our introductory remarks.—Tech. Ed.

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