A.: 18-gauge is rated to carry 2 amps, but it will carry an overload quite easily. It will be safe to run an extra valve, but to be perfectly safe wind the transformer with 16-gauge or two parallel windings of 18-gauge.

(2) Where does the filament centre tap go to, or is it left out?

A.: Filament centre tap is used to provide grid bias or reduce hum. When an amateur is constructing his own transformer, the most successful method of obtaining the centre tap is to place a centre tap resistance of about 40 ohms across the filament wiring. This provides the electrical centre, which is more accurate than a mechanical centre.

Battery Charger Problem.

K.A.H. (Lower Hutt) constructed a battery charger to the specifications in the "Radio Listeners' Guide." The rectifying valves in use (328) become very hot, as does the resistance lamp as the rate of charging of this valve is 1.5. (329), an ammeter in the circuit discloses the fact that the rate is 1.75 amps, where-It would seem then that the filament is being overheated, causing a greater emission. This will in a short time ruin the valve, so that it is wise to take a few turns off the filament winding to reduce the voltage. This valve when functioning properly emits a dull green glow. It heats, but not very much. The resistance lamp becomes quite hot, but if excessive heat is noticed, reduce the secondary voltage associated therewith.

A.C. Amplifier.

I AM constructing the amplifier described in the "Radio Record" (and in "All About the All-electric"), and I have to deviate slightly from the specifications. The secondary of the power transformer will deliver about 300 volts.

I. Is a drop of 50 volts about the correct amount to allow for a Raytheon rectifier?—Yes.

2. Do you recommend the use of a potentiometer, value 50,000 ohms, between B + and B— to obtain the voltage for the screening grid of the s-g valve?

A. Yes. This can take the place of the fixed resistance (usually 10,000 ohms) between B + detector and B—.

3. Do you consider it worth while trying a stage of resistance capacity coupling between the first audio stage and the push-pull stage?

A. Yes, this would be a decided improvement as far as tone and quality were concerned, but it would slightly diminish the volume. Note: Both output transformer and choke output are unnecessary. Put a 1 mfd. condenser in each of the leads to the moving coil and leave out transformer.

Output Problems.

A.S. (Khandallah) asks what would be the output of two B405 valves in push-pull A. These are good valves for this purpose, and with 180 volts in the plate and increased bias the output should be all that will be desired for domestic use, roughly about 15 watts.

Q: What rectifying valve at present on the market will provide 250 volts smoothed D.C. at a load of 75 milliampres?

A.: The 280 type of valve is made for this purpose.

Q.: What would the secondary voltage of the transformer to supply the value require to be?

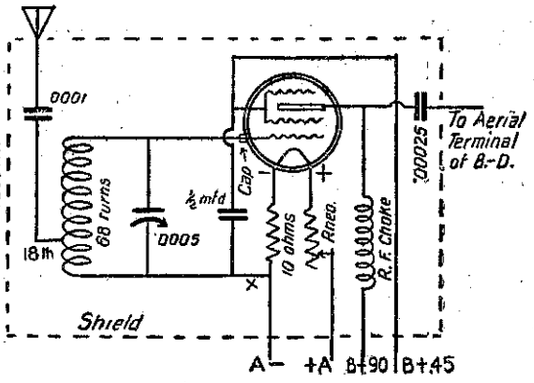
A.: The only loss that has to be provided for is the voltage drop across the choke. The resistance of the valve is comparatively small, and the practice is counterbalanced by the extra D.C. obtainable when th AC peak voltages are rectified. The resistance of choke should not be such that more than 50 volts is dropped. The AC voltage can then be 250+ 50, or 300 volts. If bias is to be obtained from the B supply, this also must be added on to the transformer secondary.

Q: What is the emission of a valve?

A.: The emission is not to be confused with the total emission. The emission in the example you cite is the normal anode current, passing in the plate circuit when anode voltage and bias are adjusted. This will automatically explain a few of the difficulties you mention.

Adding a Screen Grid Valve.

J.S.K. (Wellington) has adapted his receiver for use with a screen grid in the radio frequency stage. He finds, however, that it will not work. He has followed the theoretical diagram with one exception. The lead from the plate on the screen grid is taken to the low potential end of the following secondary transformer. This should be taken to the grid end. Examining a typical radio frequency



stage such as is shown in the diagram, the following position presents itself. The high frequency current from the plate of the screen grid valve travels to the radio frequency choke, through which it cannot pass. Radio frequency or alternating current upon encountering a coil of wire is blocked by the inductance and high frequency resistance of the coil (impedance). It is like placing a very high resistance in the path of DC current. The DC current from the battery can, however, go through this choke, as induction with this type of current is not present. All that matters here is the DC resistance and this is very low, probably only a few ohms. It is, however, blocked from earthing by the 2 mfd condenser between it and earth.

To return to the path of the radio frequency current this must find its way to the grid of the detector valve, and it has only one path left and that through the blocking condenser (which prevents DC current from the choke from passing on to the grid). If this blocking goes directly to the grid of the detector valve a transference of energy will take place and the set should function. If, however, this lead is taken to the low frequency end of the coil, it is found that a coil of very high inductance, which presents a high resistance through the path of alternating current prevents the impulses from reaching the grid of the detector valve. They can, however, find a very much easier path through A + through the battery to A— to earth. The resistance both DC and AC of the good storage battery is negligible.

Short Wave Adapter.

I WISH to construct the short wave adapter described in the Listener's Guide. I have on hand some spare parts which I wish to utilise. My condensers are .00004 and a .00035. Could you give me the necessary coil data to cover the short wave band?

A. .00004 is a capacity rather too small to be of any value in short wave tuning. .0001 is the optimum capacity, and it would pay you to obtain a condenser of this capacity.

2. Would a 500 turn choke be suitable?

A. No. Watch for special article on the design of radio frequency chokes appearing shortly.

Daniels Cell Charger.

B.W. (of Waikato) asks for information concerning a Daniel cell battery charger described in these pages.

Q.: What amount of bluestone is required?

A.: It is usual to employ a saturated solution of bluestone in a 10 per cent. solution of sulphuric acid.

Q.: Is the copper electrode used in place of the carbon usually employed. What would the output in amperes be per cell.

A.: In a Daniel cell the copper electrode, which can conveniently be in the form of a copper container for zinc and porous pot, corresponds to the carbons in other cells, and is the positive connection to the cell. The output in amperes per cell cannot be definitely fixed, but it depends upon the size of zinc electrode and the amount of acid and solution. The size of copper has effect when the internal resistance of the cell is of account, and has to be of good area when heavy current is expected from the cell. When used as a battery charger (rather an expensive method the battery can be left on charge until the zinc or acid is used up. One of the advantages of the Daniel cell is that it does not require time to recuperate after a few hours' use, but gives a steady output until either the zinc or acid is used up.

Frayed 'Phone Leads

An Efficient Treatment

ONE of the minor annoyances to which the radio amateur is subjected is that of the persistent fraying of the cords of some makes of headphones. The trouble occurs particularly at the junction of the cords and the metal connecting tips.

Phone leads which have frayed in this annoying manner generally develop more serious troubles, for the fraying of the outer covering of the leads gradually extends, with the result that the fine flexible strands of wire become exposed and eventually break. A good method of nipping this trouble in the bud is as follows. Procure a few odd lengths of ordinary bicycle valve tubing, and carefully work a piece of it over the metal tip of the phone leads until the frayed outer covering is concealed.

In this manner any further fraying will be stopped, and phone cord junctions which are treated thus may be kept in good condition almost indefinitely.