through a three-phase rectifier (which also provides field power for the drum alternator) and a series regulator unit comprising four 12E1 tetrodes in parallel (see figs 2.11). A 10K surge-limiting resistor, R1, is connected across the exciter-field supply. The input signal for the control amplifier, which drives the grids of the regulator valves, is obtained by feeding the outputs of the three rectifiers, which operate between the phases of the alternator output, together into a choke-input filter. The resulting signal is then approximately proportional to the mean of the means of the three phase-to-phase voltages. This voltage is tapped down on the 'set alternator voltage' potentiometer mounted on the control-panel of the cabinet, and is applied to the grid of V7b.

18. The cathode of V7 is held at a practically constant reference potential with respect to the negative supply line by a neon stabiliser, V6, which is connected to the grid of V7a. The anode of V7 is direct-coupled to a long-tailed pair, V5, whose output is connected to the grids of the regulator valves. During the run-up, part of the input to V7b is provided from a tapping on the motorised potentiometer, which is connected in the cathode circuit of V7, enabling the system to regulate temporarily to a lower alternator output. A subsidiary loop with a time constant of approximately one second connects the positive side of the exciter armature to the grid of V7b. By by-passing the long inductive time constant of the alternator, this subsidiary loop ensures that the system will respond quickly to sudden changes in the supply voltage.

19. Valves V1, V2, V3, and V4, in the control amplifier provide a stabilised 250V HT supply for the amplifying valves. This is related to earth by a tapping point on a bleeder chain-R11 R12 and R13- to give voltage levels suitable for direct connection between the anode of V5a and the grids of the regulator valves. The primary power source is initially the main (see fig. 2.2): but when contactor CR4 closes and CR3 opens, i.e. when the motorised potentiometer has reached its upper limit, the unit changes over to the regulated supply (between phase C' and neutral). (See fig.2.4). Relay RL1 is included as a precautionary measure, to ensure that the heater-switching circuit cannot be operated until the HT level in the control amplifier is correct. A test meter with a flying jack lead is fitted at the bottom of the bay to enable the anode currents of the amplifying and regulating valves, which flow through suitable monitoring resistors, to be measured.

## BIAS SUPPLY

20. Three-phase metal rectifiers are used for the bias supplies, one type 2L206 for the +13V supply, one type 2L147 for the -10V supply, and two type 12L147 for the -20V supply. These are fed from the three star-connected secondaries of transformer TR4, which is housed at the bottom of the left-hand bay of the power-supply cabinet. (See fig.2.11/3). Smoothing is done by 2 mH chokes. One of these, L2, associated with the -20V supply, is in the left-hand bay: the other two, L1 and L3, are in the right-hand bay, the inter-bay connection being made via the terminal board at the front of the left-hand bay. The output impedance of the bias units, which is specified at less than 0.5 ohm, is obtained by using rectifier currents considerably larger than those specified, and connecting high-wattage 0.5 ohm bleeder resistors across the outputs. These resistors are tapped to give suitable operating voltages for the interlock relays, RL5, RL6 and RL7, which prevent the HT supply from being switched