Performance

Output power (with 30V supply)	10W r.m.s.
Sensitivity for full output	430mV
Frequency response at 2W output (–3dB points)	20Hz to 35kHz
Input resistance	90kΩ
Distortion at 10W output (see Fig. 78)	<0·1%
Quiescent current of output transistors	15mA

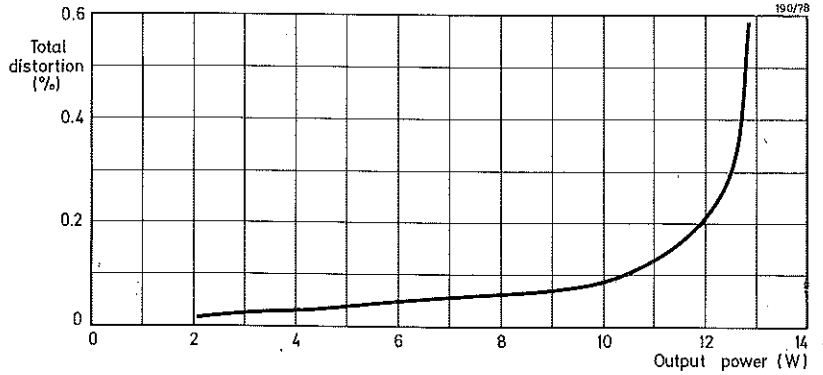

Fig. 78—Variation of total harmonic distortion with output power

15/20W AUDIO AMPLIFIER

A high-quality 15/20W audio amplifier circuit is shown in Fig. 79. This amplifier is designed to operate in class A into an 8Ω load, giving an output of 15W. With a 4Ω load, however, the circuit will operate in class AB to give 20W output power. The total harmonic distortion is less than 0·1% at full output.

The amplifier will withstand normal overdrive conditions and does not require additional protection against short-circuit conditions.

Circuit Description

The output transistors, a matched pair of BD181 devices, are driven by two BC338 transistors. These transistors are preceded by a phase-splitting stage using two BC147 transistors, and a pre-amplifier stage, a BC158.

A BC158 transistor is used in the pre-amplifier stage. A.C. and d.c. feedback is applied, giving an input impedance of 150kΩ. This stage also provides stabilisation of the mid-point voltage, which is set by adjustment of the preset resistor R_1.

Phase splitting is achieved by transistors TR_2 and TR_3 connected in a long-tail-pair configuration, and local feedback is applied by resistor R_{11}. A supply voltage higher than that applied to the output stage is necessary to increase the voltage swing available.

The driver transistors TR_4 and TR_5 are bootstrapped by capacitors C_{11} and C_{12} to reduce the dissipation, especially under overdrive and short-circuit conditions. The output transistors TR_6 and TR_7 are matched BD181 transistors designed for high power dissipation at high supply voltage. Resistors R_{20} and R_{21} ensure that these transistors can operate up to their V_{CER} rating.

Performance

Input impedance	150kΩ
Input sensitivity	
for 15W output into an 8Ω load	360mV
for 20W output into a 4Ω load	295mV
Total harmonic distortion	see Fig. 80
Frequency response	
—1dB points at ¼× full-power output	40Hz to 16kHz
—3dB points at ¼× full-power output	20Hz to 30kHz
Signal-to-noise ratio, at 50mW output power and source impedance 1kΩ	>80dB

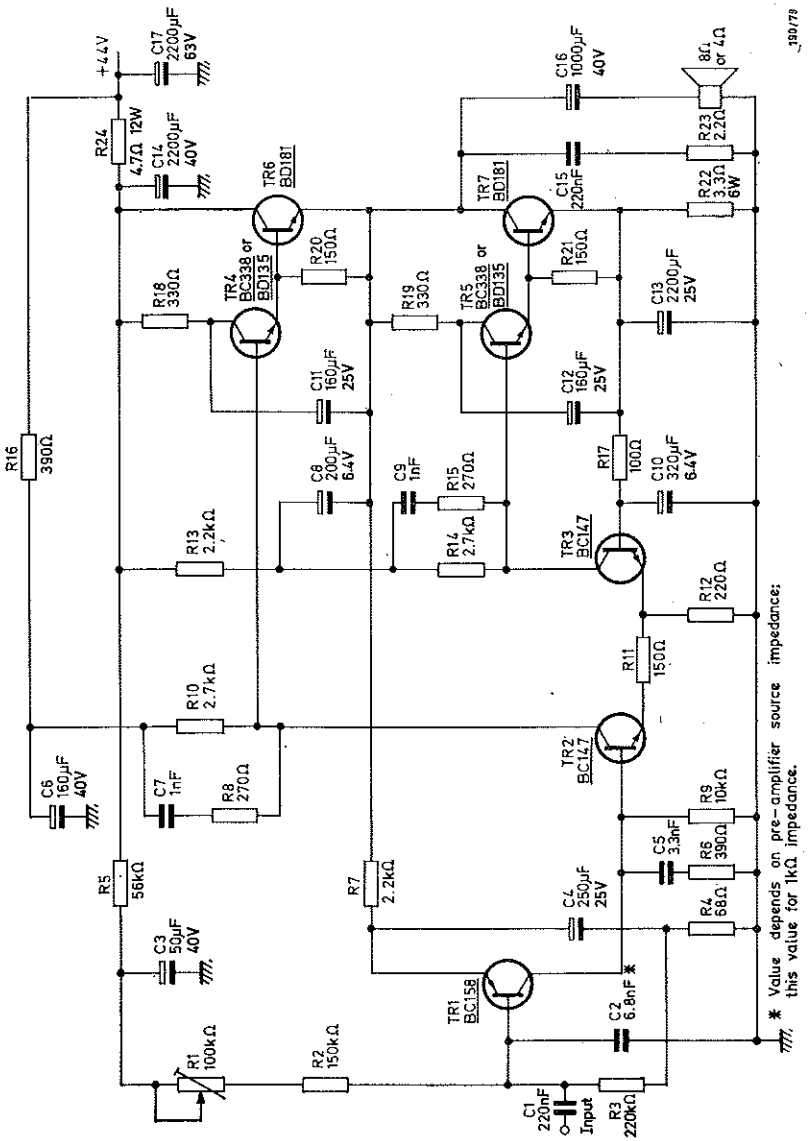

Fig. 79—15/20W high-quality audio amplifier circuit

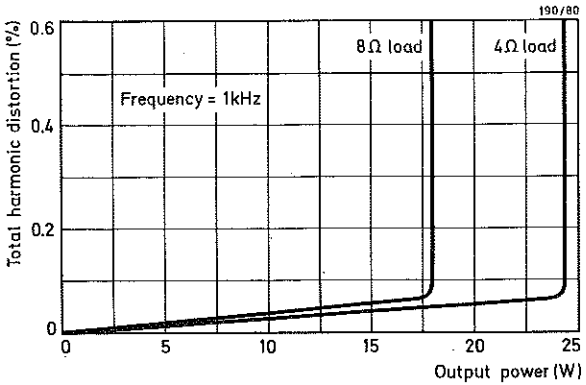

Fig. 80—Variation of total harmonic distortion with output power