voltage swing on C_3 is automatically limited to around 1V pk to pk.

When Tr_5 is off, the motor back-emf is compared with a reference from R_{11}. The resulting collector current in Tr_1 determines the mark/space ratio of the regulator. Resistors R_4 and R_7 attenuate the motor voltage by 10% to ensure that full speed may be reached within the range of R_{11}.

To prevent the inductive overshoot pulse, produced when Tr_5 switches off, from overcharging C_2, the circuit around Tr_2 is included which senses this pulse and clamps the junction of R_4 R_7 to ground. Resistor R_{12} provides adjustment of the clamp pulse length to suit the characteristics of different motors, and is adjusted to the point where the applied power responds to load changes in a critically damped manner.

The circuit will operate from almost any power supply, even rectified a.c., although the addition of a smoothing capacitor improves the speed stability. Because no attempt has been made to stabilize the supply to R_{11}, the motor speed will be proportional to the supply voltage. If accuracy of speed is important, R_{11} may be fed from a zener diode or i.c. regulator.

I. W. Rudge,
Edinburgh.

D.C. motor control

This circuit will control most types of d.c. motor and enable full torque to be produced at any speed from maximum down to below 100 r.p.m. Transistors Tr_3, Tr_4 and Tr_5 form a switching regulator where the base drive for Tr_3 is derived from the on-state base-emitter drop of Tr_5. Advantages of this unusual configuration are the ability to control high currents with a low on-state voltage drop, and the elimination of protection diodes at Tr_3 base as the