A Simple Overload Indicator

With power electrical appliances, the fuse may blow off often, and it may be a nuisance for you to replace it frequently. To save yourself from this trouble, you can use the following overload indicator circuit with the supply

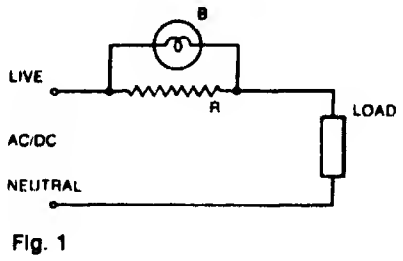

Fig. 1

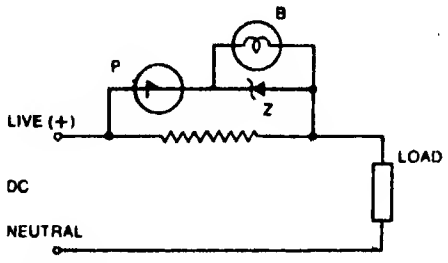

Fig. 2

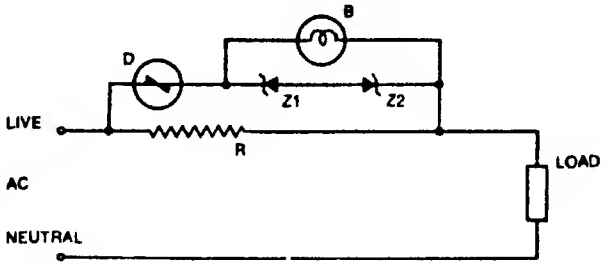

Fig. 3

PARTS LIST

B — 3V, 500 mA torch bulb
R — 0.8 ohm, 20W resistor (see text)
D — 3V, 500mA diac switch for AC
P — 3V, 500mA pnpn diode for DC
Z1, Z2 — 3V zener diode for AC
Z — 3V zener diode for DC
Misc—Connecting wires, mounting board etc.

lines so that you may take preventive measures before the fuse blows off.

The basic circuit is shown in Fig. 1. All you have to do is to tap a small voltage from the supply line across a small resistance. The resistance should be so chosen that when the line current exceeds a certain value, the voltage drop across the resistance is sufficient to make the bulb glow brightly.

Usually, the household supply lines carry fuse wires of 5-amp rating which permit up to 1100-watt load at 220 volts (at unity power factor for AC). For a 3-volt torchbulb to glow at a current little less than 5 amp, the resistance should be 0.8 ohm with a dissipation capacity of 20 watts. A suitable length of a rejected heatercoil (about 3 cm), if you have any at your disposal, may be used as the resistance. The exact length may be easily found experimentally. The circuit is suitable for both AC and DC.

It may be noted that the bulb in this circuit starts glowing from a low value of the load current (about 2 amps) and glows brigher and brighter with increasing load current. It may be difficult to distinguish between a harmless mild glow and a bright glow denoting overload. Besides, there is risk of damage to the bulb in case of accidental short circuit or sudden heavy overload.

The circuit for the overload indicator may be freed from this defect with the help of a pnpn diode to exclude mild glow at a low load current and a zener diode to protect the bulb, as shown in Fig. 2. For AC supply, it may be noted that the current flows through the bulb in this circuit through one half of each cycle. Hence, the value of the resistance may be doubled. However, it leads to a greater dissipation. Instead, a diac switch may be used in place of the pnpn diode and two zeners in series in place of one, as shown in Fig. 3.

—HIRANMAY GHOSE