

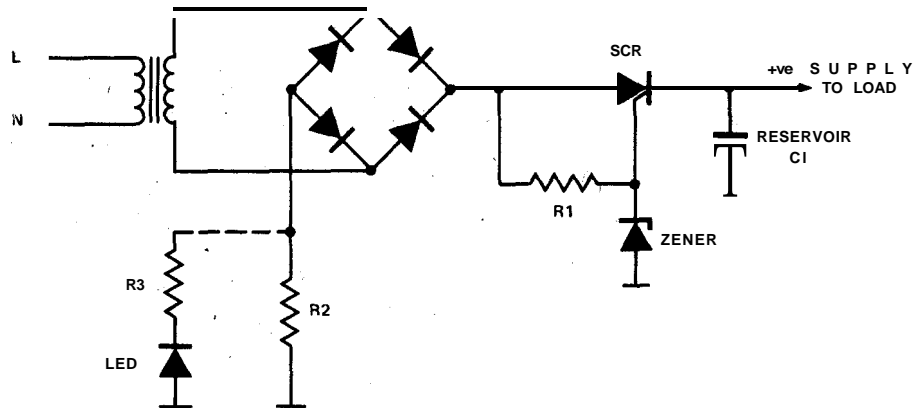
## 'BUCKET' REGULATOR

There are a number of applications where a simple cheap form of regulated power supply, giving a supply regulation of the order of 5-10% is useful. One such application is the class B audio 'amplifier. The cost of the additional components required to achieve regulation is more than offset by the saving in cost and size of the electrolytic capacitors alone.

Fig. 1. shows the circuit of the regulated supply. The only additional components required to affect regulation are the SCR, R 1, and the zener.

At switch on' the' the reservoir CI is discharged and the cathode of the SCR is at zero volts. The positive, going output from the bridge rectifier will cause gate current to flow via R1 triggering the SCR. The reservoir CI starts to charge. At the end of the half-cycle the SCR will turn off.

The following half-cycles will repeat the process charging CI until the supply voltage approaches the zener voltage. However the maximum positive potential at the SCR gate is determined by the zener, so there'comes a time when the reservoir will have charged to the point where the SCR gate cannot be driven positive with respect to its cathode. At this stage the SCR will stop firing and no further charging current will be delivered to the reservoir. The reservoir will dis-



charge via the load, whatever power is being supplied, until the gate is once more positive, when the SCR will fire again. One or more half cycles are sufficient to raise the reservoir voltage sufficiently to prevent further firing.

Thus the SCR fires as necessary to keep the reservoir "topped up" and it is this topping up action which gave the regulator its name. The number of times it fires in any particular interval being dependant on the load current taken from the supply.

There are two particularly attractive features of this type of supply. First its efficiency is high, there are none of the power losses associated with either series or shunt regulators.

The second is that it is possible to obtain very simply an indication of the current being delivered, This may

be obtained by connecting a LED (in series with a current limiting resistor R3) across the main current limiting resistor R2. The LED will flash each time the SCR conducts and hence the rate at which the flashes occur will depend on load current, the flash rate varying from once every few seconds when only leakage is being made good to continuously under full load conditions.

As an indication of circuit values the following were used for a 25V, 1.5A supply: R1=12k, R2=2R, R3=330R, CI=5000µF, 25V, Transformer 30v.

The SCR and bridge rectifier should be rated at full load current, but for many music and speech applications the transformer can be derated as much as 50%.