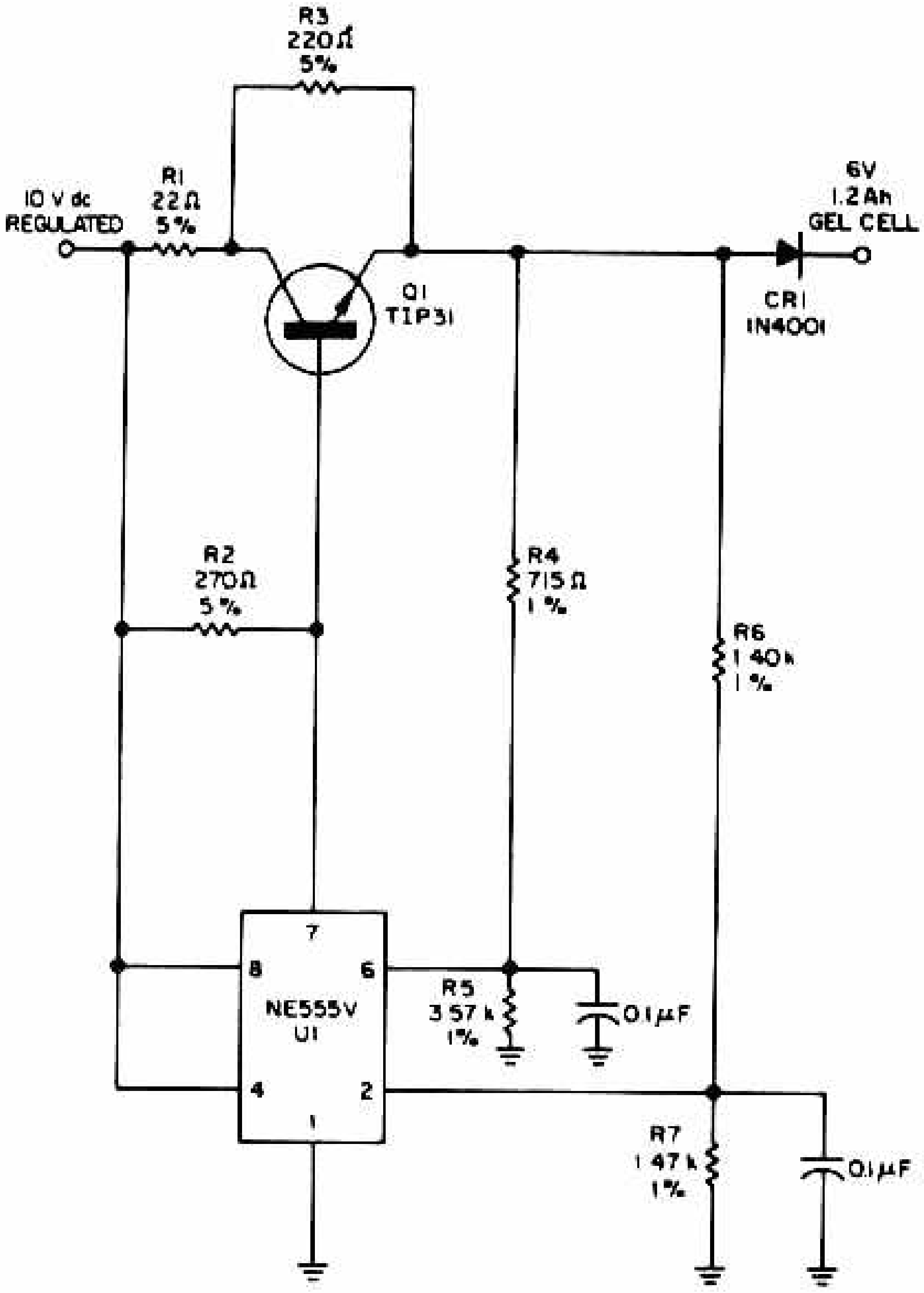
GEL-CELL CHARGER

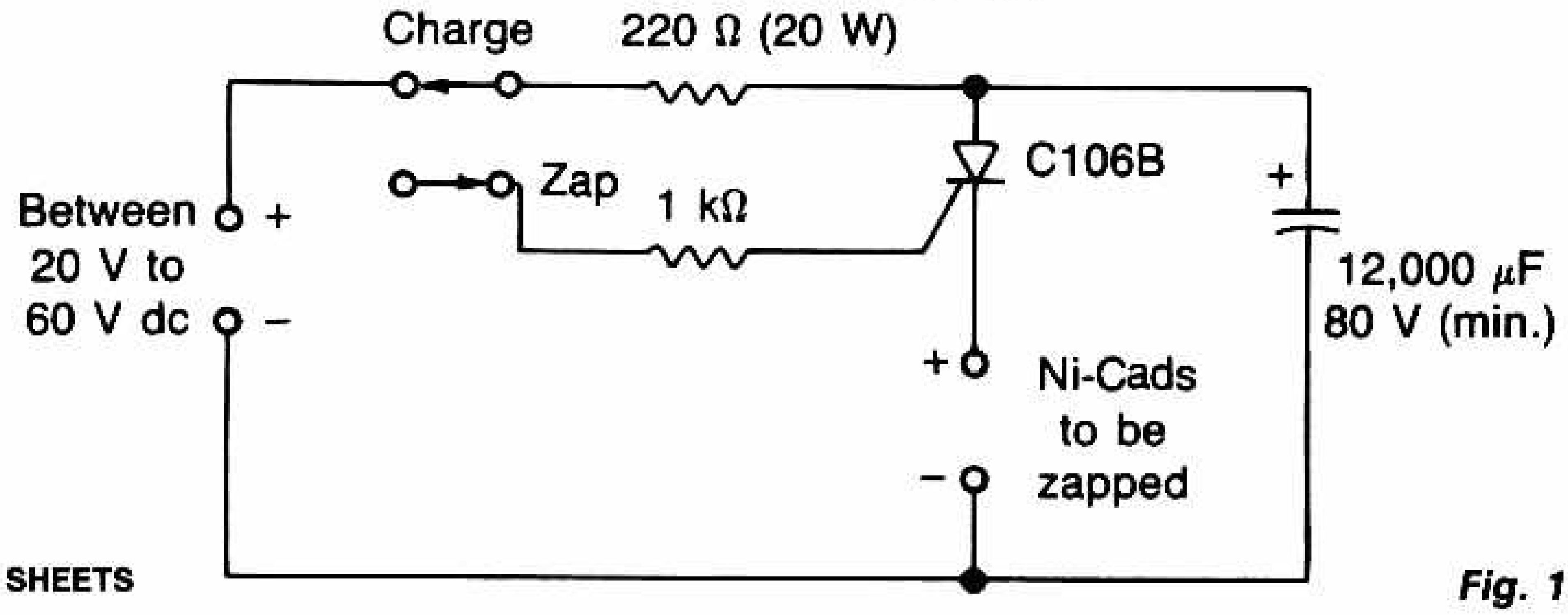


ELECTRONIC DESIGN

Fig. 1-22

This circuit detects a full-charge state and automatically switches to a float condition—from 240 to 12 mA.

NICAD BATTERY ZAPPER

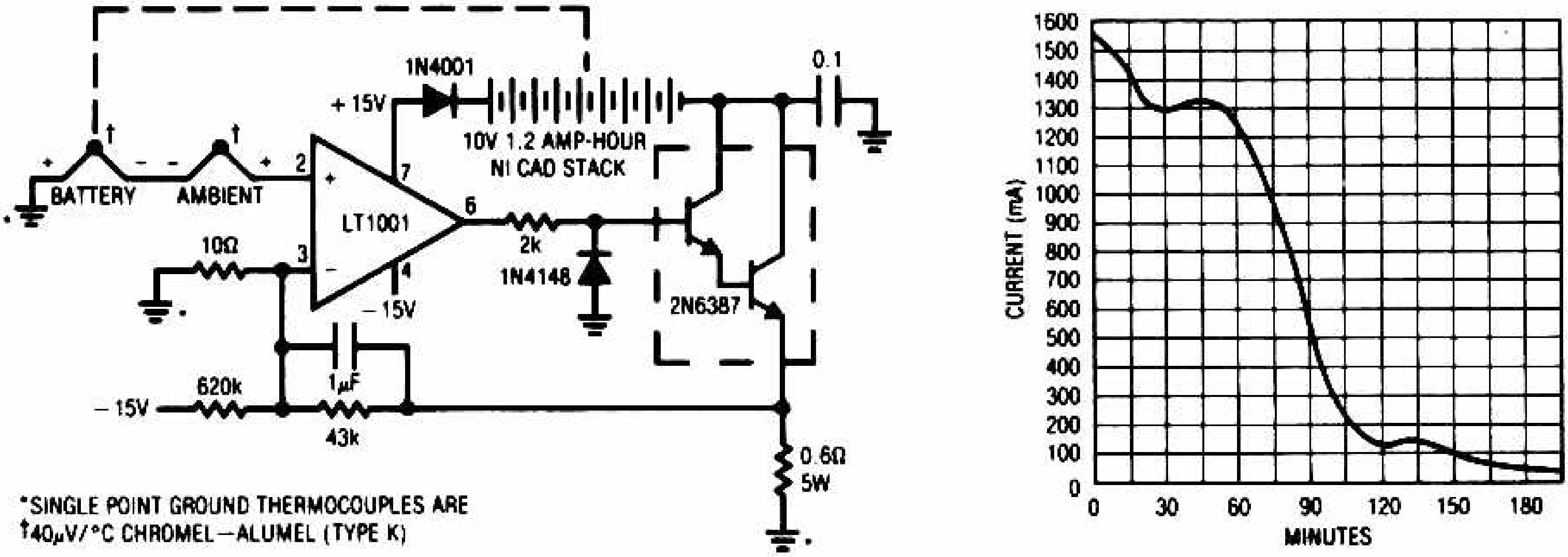


WILLIAM SHEETS

Fig. 1-23

The short in a NiCad battery can be "burned off" with this zapper. Use of the SCR keeps heavy discharge current from damaging switch contacts.

THERMALLY CONTROLLED NICAD CHARGER

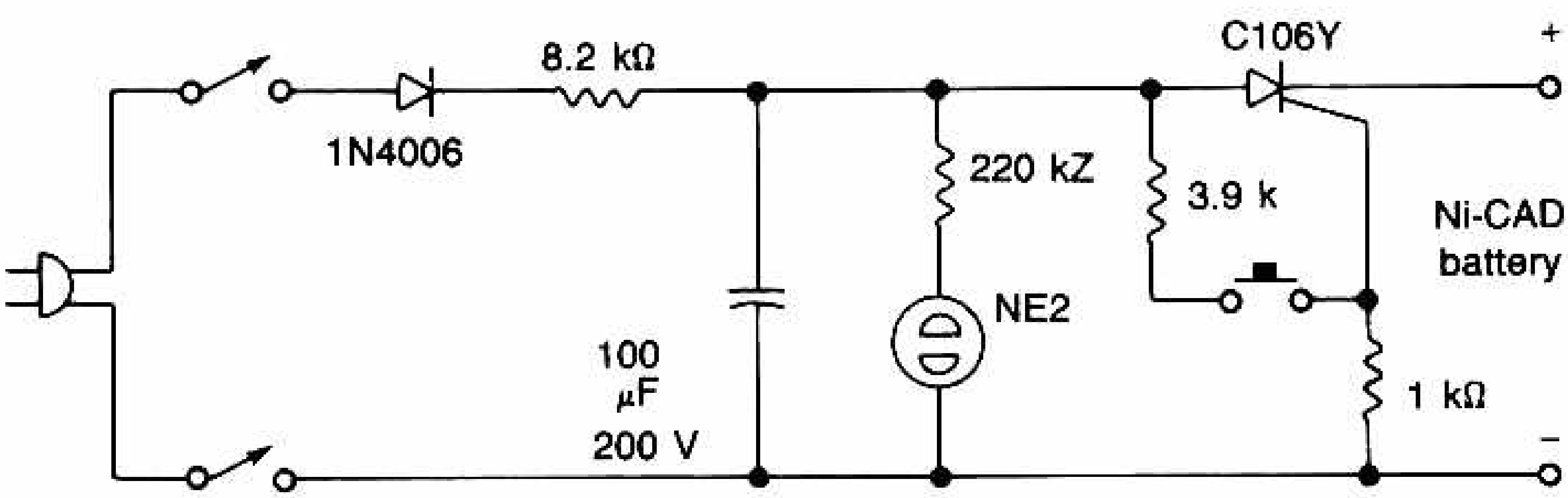


LINEAR TECHNOLOGY CORP.

Fig. 1-24

One way to charge NiCad batteries rapidly without abuse is to measure cell temperature and taper the charge accordingly. The circuit uses a thermocouple for this function. A second thermocouple nulls out the effects of ambient temperature. The temperature difference between the two thermocouples determines the voltage, which appears at the amplifier's positive input. As battery temperature rises, this small negative voltage (1°C difference between the thermocouples equals 40 μV) becomes larger. The amplifier, operating at a gain of 4300, gradually reduces the current through the battery to maintain its inputs at balance. The battery charges at a high rate until heating occurs and the circuit then tapers the charge. The values given in the circuit limit the battery-surface temperature rise over ambient to about 5°C.

NICAD BATTERY ZAPPER II

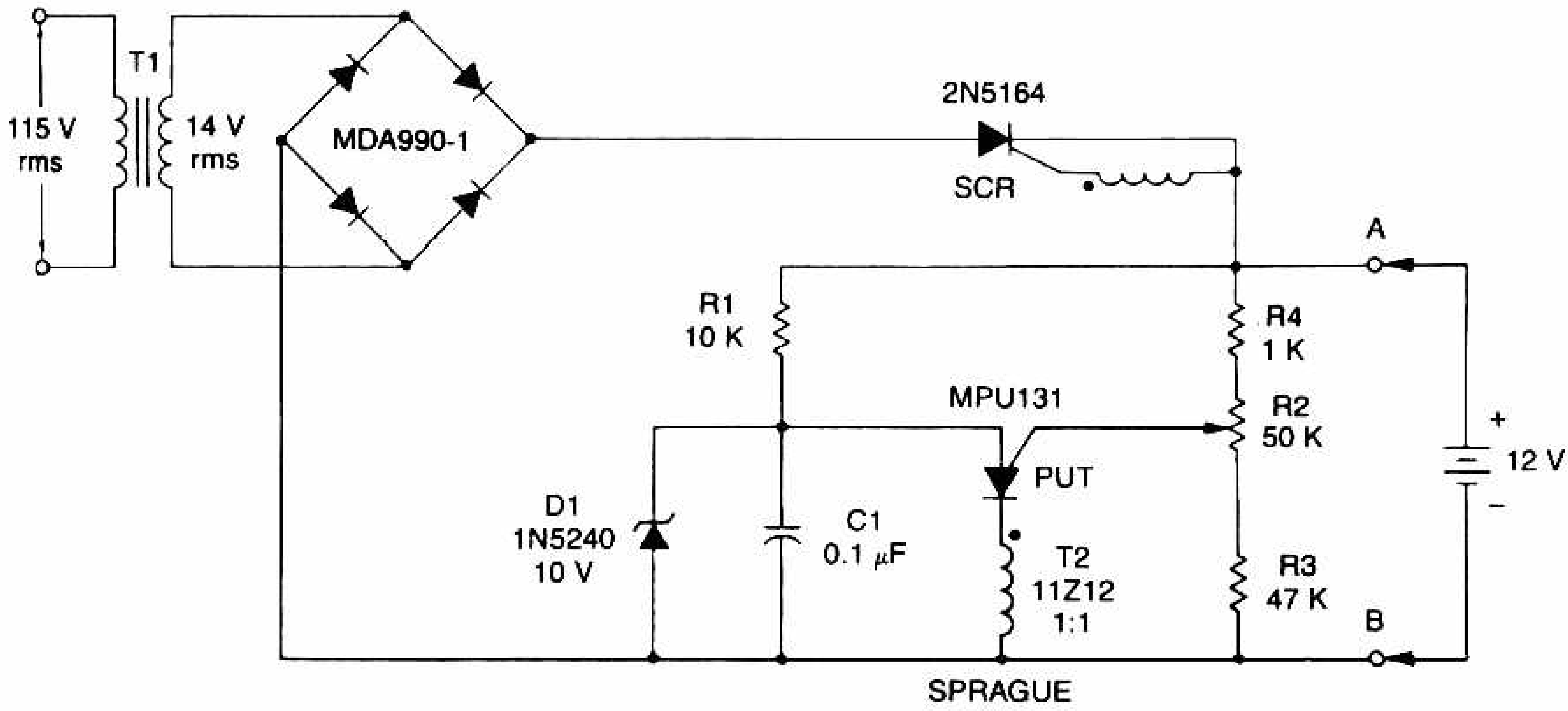


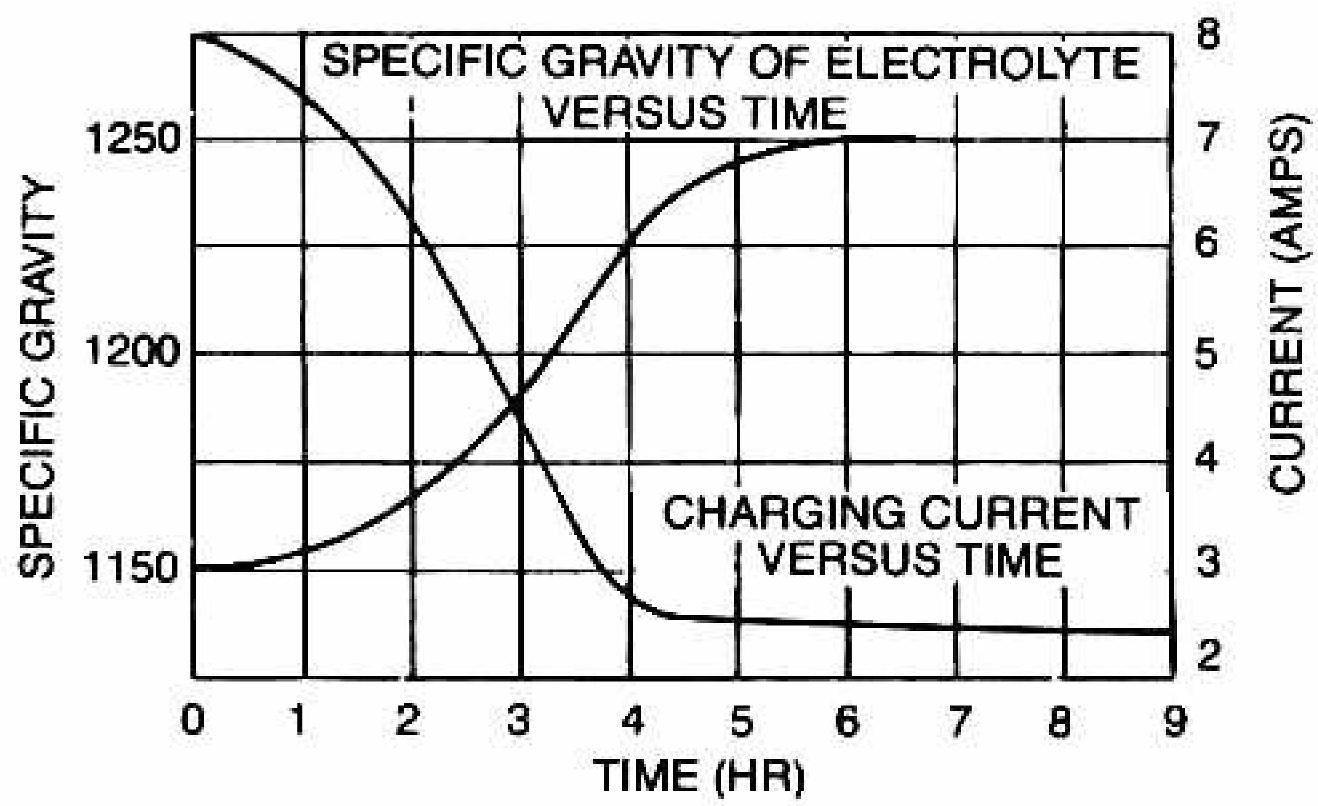
WILLIAM SHEETS

Fig. 1-25

This zapper clears internal shorts in nickel-cadmium batteries by burning them away. CAUTION: The negative battery terminal is connected to one side of the ac line. For safe operation, use a 1:1 isolation transformer.

PUT BATTERY CHARGER



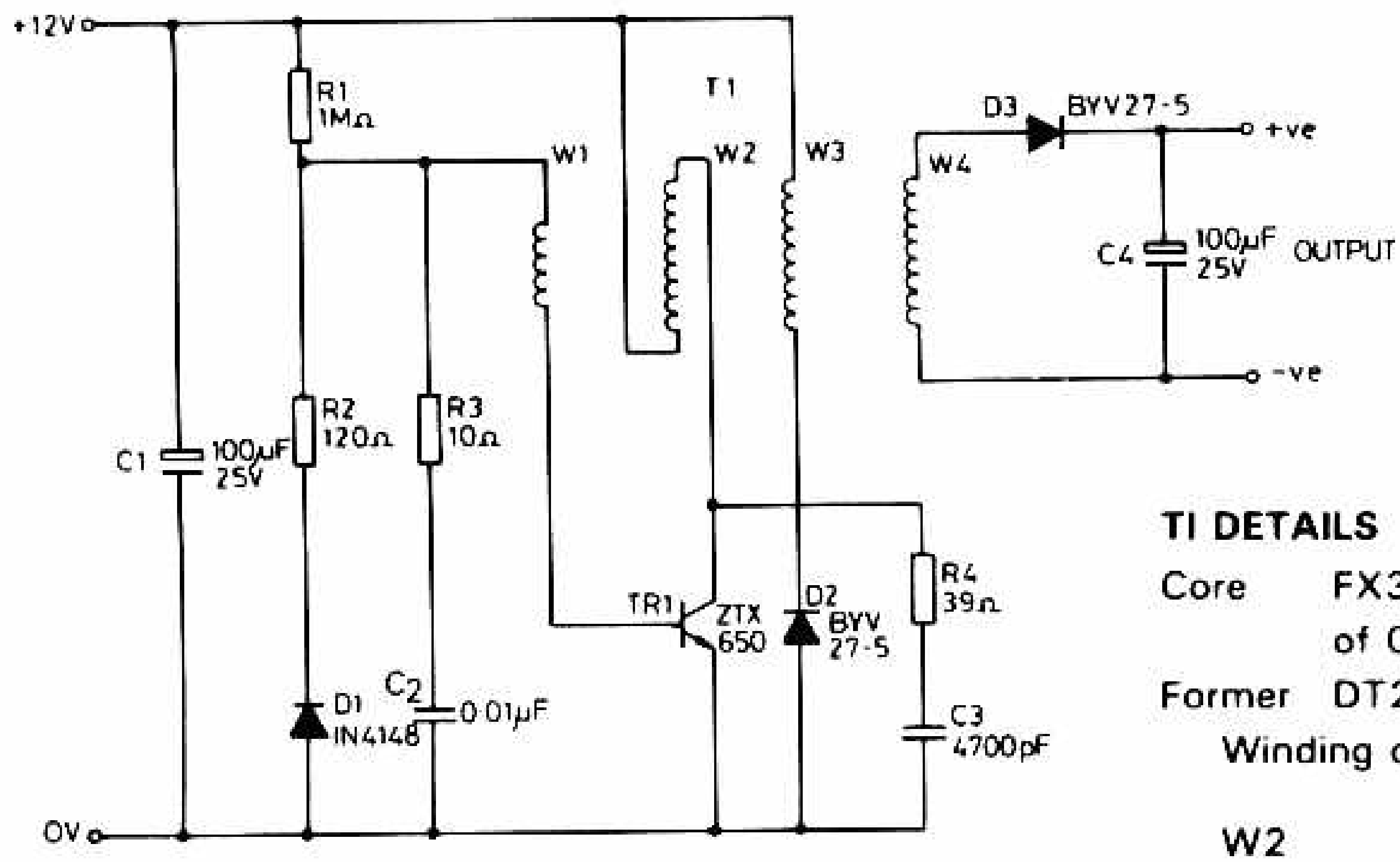


MOTOROLA

Fig. 1-26

A short-circuit-proof battery charger will provide an average charging current of about 8 A to a 12-V lead/acid storage battery. The charger circuit has an additional advantage; it will not function nor will it be damaged by improperly connecting the battery to the circuit. With 115 V at the input, the circuit commences to function when the battery is properly attached. The battery provides the current to charge the timing capacitor C1 used in the PUT relaxation oscillator. When C1 charges to the peak point voltage of the PUT, the PUT fires turning the SCR on, which in turn applies charging current to the battery. As the battery charges, the battery voltage increases slightly which increases the peak point voltage of the PUT. This means that C1 has to charge to a slightly higher voltage to fire the PUT. The voltage on C1 increases until the zener voltage of D1 is reached, which clamps the voltage on C1, and thus prevents the PUT oscillator from oscillating and charging ceases. The maximum battery voltage is set by potentiometer R2 which sets the peak point firing voltage of the PUT. In the circuit shown, the charging voltage can be set from 10 V to 14 V—the lower limit being set by D1 and the upper limit by T1.

PORTABLE NICAD BATTERY CHARGER



TI DETAILS

Core FX3437 With Gap/Spacer of 0.08mm

Former DT2492

Winding order W2, W4, W3 then W1

W2	40T	30awg.
W4	20T	30awg.
W3	13T	36awg.
W1	12T	36awg.

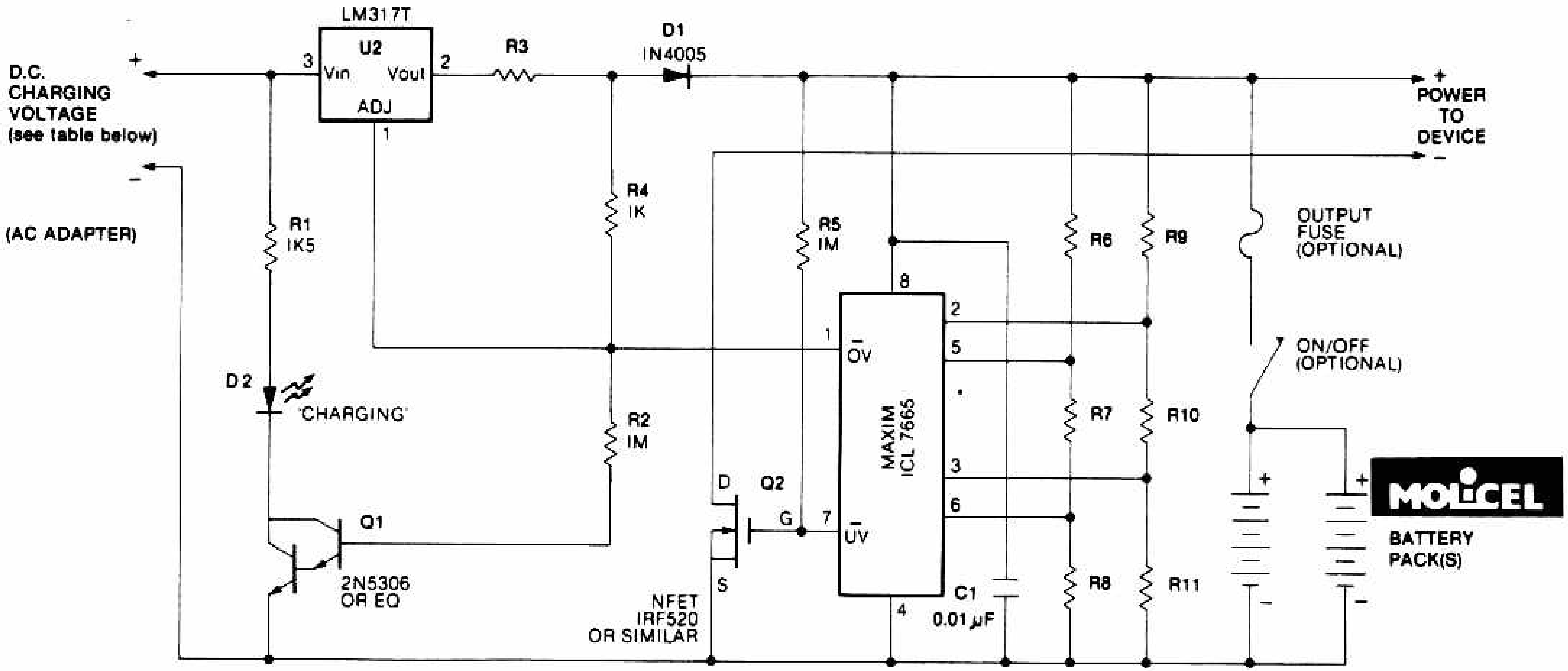
ZETEX (formerly FERRANTI)

Fig. 1-27

This circuit was designed to charge NiCad battery packs in the range of 4.8 to 15.6 V from a convenient remote power source, such as an automobile battery. When power is first applied to the circuit, a small bias current supplied by R1 via winding W1, starts to turn on the transistor TR1. This forces a voltage across W2 and the positive feedback given by the coupling of W1 and W2 causes the transistor to turn hard on, applying the full supply across W2. The base drive voltage induced across W1 makes the junction between R1 and R2 become negative with respect to the 0-V supply, forward-biasing diode D1 to provide the necessary base current to hold TR1 on.

With the transistor on, a magnetizing current builds up in W2, which eventually saturates the ferrite core of transformer T1. This results in a sudden increase on the collector current flowing through TR1, causing its collector-emitter voltage to rise, and thus reducing the voltage across W2. The current flowing in W2 forces the collector voltage of the TR1 to swing positive until restricted by transformer output loading. Rc network R4 and C3 limits the turn off transient TR1. R3 and C2 maintain the loop gain of the circuit when diode D1 is not conducting.

LITHIUM BATTERY CHARGER



MOLI ENERGY LIMITED

Fig. 1-28

Charging is accomplished with a constant current of 60 mA for AA cells to a cutoff voltage of 2.4 V per cell, at which point the charge must be terminated. The charging system shown is designed for multi-cell battery packs of 2 to 6 series-connected cells or series/parallel arrangements. It is essential that all cells assembled in the pack are at an identical state-of-charge (voltage) before charging. The maximum upper cut-off voltage is 15.6 V (6×2.6 V).