You CAN Parallel Storage Batteries

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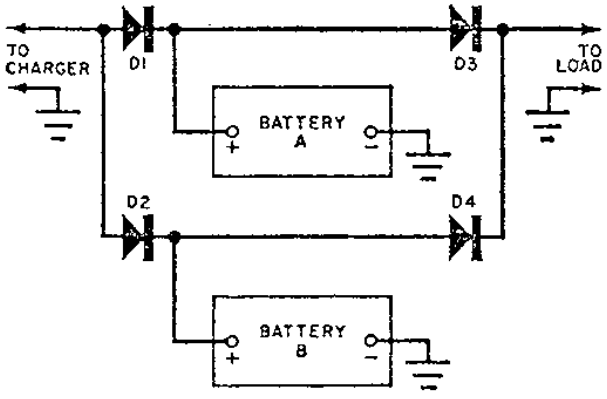
UNTIL high-amperage solid-state rectifiers became commonly available, it was not practical to parallel wet cell storage batteries. The slightest difference in the open-circuit voltages of parallel-connected batteries will set up a circulating current whereby the battery with the greater voltage will tend to charge the one with the lesser voltage. This circulating current is capable of damaging both batteries.

When the solid-state rectifier came along, it became practical to parallel storage batteries for increased ampere-hour capacity without setting up a circulating current loop. If, for example, diodes *D1*, *D2*, *D3*, and *D4* are connected in a parallel circuit containing two batteries as shown in the schematic diagram, potential differences between the batteries cannot cause an appreciably large current to circulate. The little current that does circulate with the reverse-biasing of *D1* through *D4* is generally on the order of a few milliamperes.



Diodes D1, D2, D3, and D4 prevent circulating current loops from being set up between batteries A and B when the batteries are connected in parallel.

The diodes form a bridge circuit, allowing a battery charger to charge both batteries through *D1* and *D2*. Batteries *A* and *B* deliver current through *D3* and *D4*, respectively, to the load. And, because *D1-D2* and *D3-D4* are connected back-to-back, the possibility of a circulating current loop being set up is overcome. Both batteries, however, will still supply current to the load.

If more than two batteries are to be connected in parallel, another pair of diodes (connected as shown for *D2* and *D4*) must be used with each additional battery. Be sure that the PIV and current ratings of the diodes are sufficient for the potentials and currents that must be handled. For example, if you want to charge a 12-volt battery at 10 amperes and have a 10-ampere drain by the load, the diodes you use would have minimum 25-volt PIV and 10-ampere ratings. (Radio Shack's Stock No. 276-1060 stud-mounted diodes, with 50-PIV and 12-ampere ratings, will suffice for most applications. These diodes sell for 59 cents each.)

When two or more batteries are to be used independently (as for mobile CB or ham radio) but charged from a single generator or battery charger, diodes *D3* and *D4* should be eliminated and the connections from *D1* and *D2* should be used as the "hot" lines for two separate circuits.

The interesting feature of the arrangement shown is that during recharging the weaker battery will receive the lion's share of the charge current. Conversely, the battery with the greater charge will deliver the greater amount of current to the load without interactions. It isn't often that nature cooperates so nicely to bring about the most desirable conditions. -30-