Solving "A" Battery Problems

Use of Daniel Cells

BATTERY problems, especially those of the "A," loom largely in the troubles of set owners who are far removed from electric power. Dry cells generally prove an expensive item, for they are constantly running down. Accumulators have sometimes to be taken long distances over rough roads, often impassable in winter, to be charged. They are not infrequently damaged, when not only inconvenience but expense is involved.

Some time ago, in an article by "Hardup" the Daniel cell type of primary battery, which figured largely in the early days of electricity, was mentioned as being a good charger for "A" accumulators. This aroused a considerable amount of interest and letters came from all parts of New Zealand. Further details were given on different occasions in Questions and Answers and just recently the writer happened to mention in the "Exporter" that particulars of this battery would be supplied on request. The amount of correspondence resulting from that remark was amazing, and there was apparently only one thing to do, and that was to go into the whole question fully and prepare a special article.

The details which are now given have been kindly supplied by a very satisfied user of this type of battery —Mr. Watson, of Brooklyn, Wellington. Mr. Watson has done a considerable amount of experimenting, and has evolved the strengths of the solution to a nicety, but he is not alone, for several correspondents have written us stating that they have had great success with this charger. It is not universally used because it requires a fair amount of attention, and unless a person is interested in keeping the battery always in the best condition it is no use his attempting it. In many cases it can be used without an accumulator, though a small capacity one is preferable. The battery of primary cells is permanently connected to these and so the accumulator constantly receives a charge.

Here are the parts required for one cell, which will total approximately 1.1 volt:—A glass jar at least 3in. wide at the mouth—telephone type of glass Leclanche containers are the best, but anything will do providing it is about the size of a 2lb. jam jar. In fact one of these would do quite well if the top were cut off to allow the porous pot to be inserted. An open mouthed jam jar would be even better.

One porous pot. Correspondents have had difficulty in obtaining these and so we have entered into an arrangement with the Post and Telegraph Department that they may be obtained at the price of 6d. each upon application to the Stores Manager, P. and T. Department, Wellington, or Chief Postmaster, Christchurch.

A quantity of copper sulphate, or, as it is better known, bluestone. For eight or nine cells 2lbs. will be required every fortnight.

Sulphuric acid. This should be obtained from a chemist who sells it 99 per cent. pure. If this is used one part in 60 to 80 parts of water by weight will make a sufficiently strong solution. The amount, of course, will vary with the number of cells to be used.

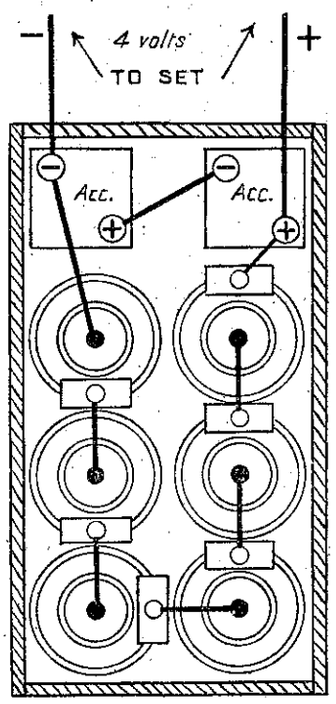
A quantity of copper sheet.

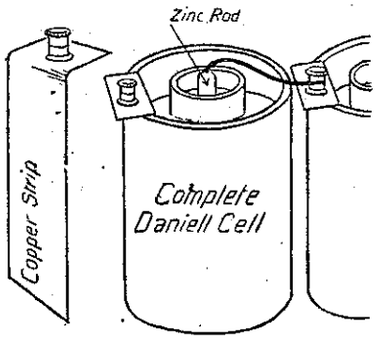
A quantity of scrap zinc, which can be obtained from any foundry or the "tin" lining of packing cases.

Distilled or pure rain water collected in an earthenware jar.

An ounce of mercury to each pot. This is not essential but it lengthens the life of the zincs.

For a six-volt accumulator about 9 cells will be ample and should, if valves of light filament consumption are used, keep the battery fully charged. For four volt valves 6 or 7 will be ample and for two volt, 4 will be needed. The assembly can be quite well understood from the accompanying diagram.





A charger for a four-valve set. Two two-volt low-capatiy accumulators are shown in series.

The scrap zinc is collected, melted down, and moulded into rods 7-8ths or an inch thick and long enough to clear the porous pot. While in the mould place a terminal taken from an old "A" cell. This has a long shank, and will make a good contact with the zinc, otherwise a copper wire properly cleaned should be pushed in. It should be long enough to connect with the copper of the next cell. Those who do not wish to go to the trouble of making their own zincs can obtain them ready made. These are amalgumed and will make unnecessary the use of mercury. The thicker rods which can be home-made as we have described will give better service.

Having moulded the rods, the next task is to prepare the copper. There is no wear on this, so the thinnest sheet copper can be used, 24-gauge being quite suitable and can be obtained from an ironmonger or metal worker. It is cut into strips 6½in. x 2in. wide. A terminal from the outside zinc container of an old "A" cell should be soldered on to the short side for contact with the wire on the zinc of the next cell.

It will be found after a cell has been operating for some time that the copper will become heavier. This is due to a deposit from the copper sulphate, or bluestone. The deposit is pure copper, and one of our correspondents at least sells this when it becomes too thick and obtains the price of a new set of plates thereby.

Into the porous pots, which should be thoroughly clean, pour an ounce of mercury. This should be just sufficient to thinly cover the bottom of the pot. This is, of course, unnecessary if the zinc is amalgumed or if the constructor does not intend to use mercury. On the zinc pour a solution of sulphuric and water.

To make this solution with pure sulphuric, put 10lb. weight of water into a container and pour in very slowly two ounces weight of sulphuric acid.

The method of mixing sulphuric acid and water is very important. Pour the sulphuric acid slowly on to the water, not the water on to the sulphuric. The latter will probably cause an explosion.

Those who cannot obtain pure sulphuric could use commercial, which, being not so pure, must be mixed at a strength of one part to 40 by weight. Epsom salts may be used instead of the sulphuric, and a half-saturated solution is made by mixing 6½ ounces Epsom salts to a pint of water. The sulphuric acid solution is now poured into the porous pots, which are placed in the jars. Put a handful of bluestone into each pot and pour upon it the distilled water. Now insert the zincs and the cells are complete.

THEY are connected up as is shown in the diagram. The zinc of one is connected to the copper of the other until the required number of cells are connected up. There will be a zinc and