Thomas A. Edison's Latest Invention

A Storage Battery Designed and Constructed from the Automobile User's Point of View

By Joseph B. Baker, E.E.

For over a decade, Thomas A. Edison has been working to produce a type of storage battery better than the old lead type. At last he has succeeded. His new cells are now in actual commercial use. In the following article the reader will find a description of the new battery, written after a painstaking study of its manufacture.

LD; indeed, is the idea of the commercial storage battery. Lead plates were immersed in an acid electrolyte, by Gaston Planté in 1861. Émile Faure brought out the pasted-plate battery in 1879, and Charles F. Brush in 1881 introduced improvements which made the lead battery a factor in electric vehicle work, producing a cell which would give eight watts of electric power per pound of material. From these early beginnings, many inventors have sought to increase the electrical efficiency, and the durability or "life" of the cell, and reduce the cost of manufacture.

It was in the early eighties that the public began to think about "stored electricity" which could be bought by the can, as it were, like any other commodity. This dream has come true in the new Edison nickel-iron storage cell. Stored electricity finds its greatest usefulness in propelling cars and road vehicles, and it has been for this application, primarily, that the Edison storage battery has been developed. The need of the electric vehicle was recognized by Mr. Edison nine years ago. He saw that there are two viewpoints: that of the electrical man with his instruments, his rules for efficient operation and reasonable life of the battery, his absolute knowledge that the same care should be given a vehicle battery that is given a valued horse or even a railroad locomotive; and that of the automobile driver, who simply wishes to go somewhere with his car, and who, when he arrives somewhere, wishes to go back. And in this long-promised battery the highly practical nature of Mr. Edison's work is once more exemplified in that he has hold uncompromisingly to the automobile's point of view. The fact to be faced, he realized, is that the electric vehicle user will work his car to the utmost, and will be limited only by repairs and breakdowns; just as the average gasoline car driver has always operated his car to the limit of repairs and breakdowns. How well he has succeeded in aligning his battery to this ideal, the automobile driver will appreciate from the figures of actual performance that are now available. A recent average of 144.35 miles on a single charge was made in a family-type electric vehicle equipped with the new battery. This figure is the average of four trips, each with New York City (Manhattan) as the starting point. The longest of these trips, 172.1 miles, was to Babylon, Long Island, by way of Mineola and Plainview, returning by the southerly route through Manasquan and Freeport. The map distance by this route is 96.9 miles, and 81.2 miles additional was covered after the regular run, the average speed being 10.83 miles per hour.

The original Edison storage battery, known as the type E, was put out about seven years ago. The type E cell marked a definite step in invention, in that it proved the commercial success of a wholly new voltaic combination, a radical departure from the lead plates in an acid electrolyte. The lead cell had too many inherent weaknesses to realize the full promise of "stored electricity" as a motive power for vehicles. Mr. Edison had set his staff to work on an entirely new line, and the outcome was a nickel-iron element immersed in an alkaline electrolyte, lighter and cleaner than the lead cell, with lower cost of operation and upkeep to offset its higher initial cost, and possessing hitherto unheard-of properties of remaining undeteriorated either by overcharging or being left uncharged. These were the qualities demanded by the automobile user. The cell developed certain weaknesses in service, which caused the inventor to withdraw it from the market and resume experiments to improve the form of the voltaic combination, in order to obtain better electrical properties and a longer life.

The new series of experiments lasted four years, and resulted in the present commercial Edison cell, known as the type A. This cell is now being actively marketed for electric vehicle work in three sizes, the A-4, A-6, and A-8 cells, having respectively 4, 6, and 8 positive plates and 5, 7, and 9 negative plates, the two outside plates of the element being negatives. The normal discharge voltage is 1.2, and a battery regarded as completely discharged when it shows an average of 0.9 volt per cell. That each size has the dimensions of the individual (Continued on page 45.)
The New Edison Storage Battery

Whether you are a user or a prospective user of electric vehicles, either pleasure or commercial, read through this chain of evidence:

The Adams Express Company, seven years ago replaced lead battery equipment in four of their delivery trucks, with Edison equipment. Since that time they have purchased over 150 cars, all equipped with Edison Batteries.

Tiffany & Company replaced lead batteries with Edison Batteries in three of their delivery wagons, seven years ago. They have since bought eighteen more Edison-equipped cars.

Barn & Son, after operating fifteen cars equipped with Edison Battery for three years, discarded lead battery equipment in a Ingenious machine which deposits alternately electro-platings of copper and nickel, the copper being dissolved out subsequently. So galvanic are the nickel disks cut from a 21 per cent solution of pure potassium hydrate (caustic potash) distilled water.

The United States Express Company have been operating twenty-five vehicles with Edison Battery for several years.

Abraham & Straus, when they decided to put in motor vehicle equipment, purchased twelve vehicles equipped with the Edison Battery.

A. A. Vantine & Son have been operating thirteen Edison-equipped vehicles over a period of four and a half years.

R. H. Macy & Company have been operating seventeen Edison-equipped cars for the past three and a half years.

Four of the foremost electric pleasure vehicles are now equipped with the Edison Storage Battery—Detroit, Bailey, Baker, and Waverly.

THERE are vehicles today giving more than double the mileage of electric pleasure vehicles with lead batteries—an average well over a hundred miles on a charge, while the lead battery in most instances will not give an average better than fifty miles on a charge.

The weight of the Edison is only about half, per capacity, of that of the lead battery. The Edison is not subject to any of the ills of the lead battery—it is not injured by over-charging, by too rapid discharge, by complete discharge nor by standing idle for any length of time either charged or discharged. The Edison is built to withstand the most intense vibration and rough usage. It requires less care and attention than any other battery and its life is many times that of the lead battery.

Write us today regarding the New Edison Storage Battery for electric automobile propulsion, gasoline car or motor boat ignition, incandescent lighting of your motor car, yachting or motorboat—or for any other battery requirements.

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miles obtained must be compared with the total cost of operation of the vehicle, with due allowance for all around reliability. The nature of the support materials and the method of applying the active material to the plates enable the cell to stand short circuit conditions without injury. It is stated that the cell improves in use, instead of deteriorating, and the company guarantees to renew any battery at any time for half the cost of a new battery.

In charging, the rate can be varied through a wide range, and may be far higher than with the lead battery. "Boosting charges"—given a vehicle battery of given voltage must contain a larger number of cells than a lead battery, twenty-five being equivalent to forty of the nickel-iron cells of same amper-hour capacity; but the low voltage and comparatively high internal resistance are disadvantages from the purely electrical rather than the vehicle point of view. The cost of charging current, and hence also the efficiency of its recovery in the discharge circuit, is a minor part of the total expense of operating the vehicle; and the low electrical efficiency of the battery is offset by its light weight—which not only lightens the construction of the vehicle, but increases the proportion of "paid for" carried by the same horse—by its ruggedness in service. In estimating the true commercial efficiency of a road vehicle transportation, the ton-miles obtained must be compared with the total cost of operation of the vehicle, with due allowance for all around reliability. The nature of the support materials and the method of applying the active material to the plates enable the cell to stand short circuit conditions without injury. It is stated that the cell improves in use, instead of deteriorating, and the company guarantees to renew any battery at any time for half the cost of a new battery.

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nine-tenths of the normal capacity in a short charge at a high rate than to give the long, slow charge, traditionally deemed advisable for lead cells. A commercial vehicle battery of high capacity will give the best results with a 75 to 100 percent charge at high rate every day, thereby avoiding the loss of efficiency that comes at the end of a "normal" charge at the prescribed rate. A battery showing about 100 volts when charged can be thrown directly on the 110-volt mains without resistance in series.

It is the discharge performance of the battery, expressed in "mileage" in the battery, that the auto driver is most interested in. Hill climbing is a favorite test of an automobile power plant, and the performance of the Edison battery in this respect is a good indication of its road capacity. An electric pleasure vehicle equipped with the battery, the total weight being 2,350 pounds, has climbed Fort George Hill, a distance of 2,138 feet with 11 percent grade, twenty-one times on a single charge. Another interesting performance is the high output of the Edison battery in connection to bell circuits. The capacity of the cell, and a thumb-valve on the end of the spout, the battery compartment must be left wide open. The small amount of electrolyte in the cell is sufficient to hold up the electrolyte in the bell for the gas to escape during the discharge of the cell, and a thumb-valve on the end of the spout, the battery compartment must be left wide open. The small amount of electrolyte in the cell is sufficient to hold up the electrolyte in the bell circuit, but when the level of the electrolyte has risen out of contact with the end of the spout, the bell rings. It is important to avoid filling the cans too full, for these leaves no room for the gas to escape during charge and the electrolyte is liable to be forced out in bubbles—a cause of low efficiency.

The potash solution becomes contaminated in time, from impurities that have accidentally gotten into the cell either directly or by way of the filler spout (which may be laid down carelessly on a dirty bench), or by absorption of gases in the garage. It therefore needs to be replaced by fresh electrolyte about once in eight months for a commercial vehicle battery, or once a year for a pleasure vehicle battery.

Some Mechanical Road Guides

(Continued from page 33.)

road maps and guide books in that one must first know his precise location on the map, and then he can tell when and how to proceed; a mistake of even half a mile in the distance from a given point may make a turn which will entirely off the course and cause much trouble.

A card serves for only one route, and if this route is more than 100 miles long but less than 200 miles, the card is not used. The directions are reversed and the directions are followed. The manufacturers of the instrument supply cards covering a great many cities, and known touring routes in the States, including several transcontinental routes, and also principal touring routes in Europe. About 400 routes are catalogued for this country alone. The cards can be ordered by number of orders, and kept in good order on a board case furnished by the manufacturer.

Should the tourist wish to make a tour from the regular route or take a side excursion, the instrument can be reset by means of the screw in the back to bring the card to correspond with the new route.

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I do not hesitate to recommend this wonderful remedy to those whose nervous systems are undermined by overwork, worry or disease, they have observed how it has induced renewed energy, life and vitality into starved nerves, how it has regulated the appetite, digestion, in short, how wonderfully it has made the human machinery fit to perform its functions in the most perfect manner.