

STRUCTURAL DETAILS OF THE EDISON STORAGE BATTERY.

The crate of cells of the Edison nickel-iron storage battery, exhibited recently at the automobile show, gave the public a good idea of the general appearance and mechanical construction of the new cell, which is in several respects a great improvement over those of the lead type in use to-day.

In the first place, the jar used is of sheet steel, corrugated to strengthen it for about two-thirds of its height. It is not liable to crack or break, and hence is not apt to become leaky, as so often happens with a rubber jar. The plates fit tightly in the jar, with their vertical edges pressing against hard rubber side frames that have properly spaced grooves to receive them. They rest on four suitably-grooved hard rubber wedges, and are separated by hard rubber strips. All the hard rubber parts are shown in black in our diagram, and thus can be readily distinguished.

The plates themselves consist of very thin sheet steel frames, into the "windows" or slits of which are hydraulically pressed briquettes of iron-and-graphite or nickel-and-graphite (according to whether the plate is a positive or a negative), covered with perforated, steel, retaining lids. A full description of the grid and plate will be found in the SCIENTIFIC AMERICAN of June 15, 1901. The positive plates are all connected together within the cell and fastened to the positive terminal, which is brought out through a rubber bushing in the cell cover. A nut, held from unscrewing by a cotter key, clamps the connecting wire to the terminal, outside the cell. The negative terminal is brought through the other side of the cover in the same manner, and connected outside to the positive one of the adjoining cell.

There are two other openings in the cover of the cell—one for filling it and one for allowing gas to escape. The former has a hinged spring cap that opens upon releasing the catch. The gas valve has a mushroom-shaped top that, should the cell be overturned, closes the two small gas passages in the gauze-fitted cap over it and effectually prevents any liquid from escaping. The fine wire gauze, operating on the principle of the Davy miner's lamp, keeps the gas from firing back and blowing up the cell, should any of that which escapes become ignited. The cell cover fits sufficiently close upon the top of the jar to make a fluid and gas-tight joint.

The cells exhibited were of 200 watt-hours capacity, they being capable of furnishing 160 ampere-hours at an average discharge voltage of 1.3 per cell. They can be run down to 0 without damage, but ordinarily are not discharged below 0.75 volt per cell. Each cell has 24 plates $9\frac{3}{4} \times 4\frac{3}{4}$ inches in size and 0.1 inch thick. These plates are capable of discharging at as high a discharge rate as 200 amperes without damage. A sample plate was shown, taken from one cell of a set that had run a vehicle 3,100 miles over bad roads, and the only thing that distinguished it from a new plate was a slightly yellow coloration of the nickel-plated grid and briquette-retaining covers. The briquettes of active material appeared to be in very good condition, thus showing the cell to have a very long life and to be durable. More tests of the new bat-

OIL FUEL ON THE STEAMSHIP "MARIPOSA."

BY ENOS BROWN.

The advantage of oil as fuel for sea-going vessels has been demonstrated, it is believed, conclusively, on the Pacific coast.

The steamer "Mariposa," of the Oceanic Steamship Company, was lately withdrawn from service for the purpose of renewing boilers and engines which had deteriorated through long and continuous usage. The "Mariposa" was built in 1883 by the Cramps, and is a superior type of an iron vessel. Her gross tonnage is 3,158, and she is 320 feet in length over all. When nearly ready for sea it was determined to equip her for

heating surface of the two double-ended boilers was 8,302 square feet, and the square feet of heating surface to each pound of oil was 2.76. The temperature of oil in storage tanks was 90 deg. to 100 deg. In heaters the temperature was maintained at 140 deg.; the temperature of the air in furnace fronts used in burners was 300 deg.; while the temperature in the uptake was 550 deg. to 600 deg.

The economical results of the substitution of oil for coal, aside from saving in the cost of fuel, consisted in dispensing with the service of six firemen at \$50 per month each and twelve coal passers at \$40 per month—a saving of \$780 each month in wages.

As the engines were new and never had run with coal as fuel, the saving in this particular could not be computed. In the opinion of the chief engineer, oil at 65 cents a barrel f. o. b. equals coal at \$3 a ton.

Particular attention was paid to the odor perceptible throughout the steamer on the first voyage, and the conclusion was that it was not noticeable. The absence of soot and smoke added greatly to the comfort of the passengers.

In the fireroom no ill effects of the gas were felt, the ventilation being perfect in every respect.

On the return voyage the "Mariposa" made port a whole day ahead of time. Data of the second voyage appeared even more favorable, owing to the growing familiarity of the men with the management of the new fuel. The consumption of oil on this trip was perceptibly less.

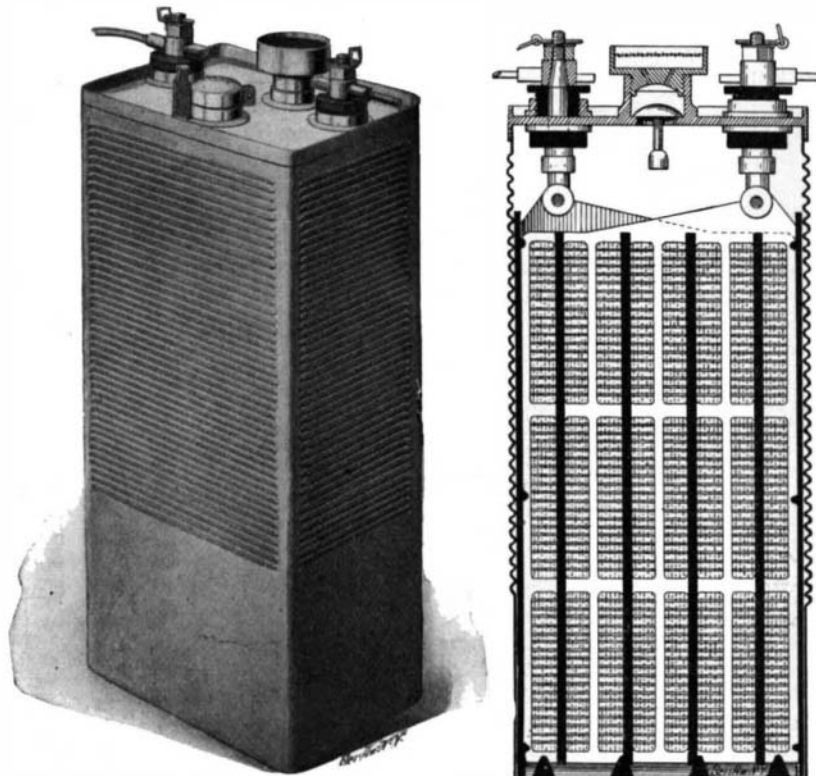
In the fireroom six men are now required, two to each watch, one only being required for tending the burners.

The Lore of Rheumatism Rings.

Sufferers from rheumatism who believe they will be cured of their aches through wearing a certain kind of metal ring would be surprised perhaps to hear that they are keeping alive an old superstition that owed its origin to one of the ceremonies performed on Good Friday. The ceremony was called the Blessing of the Cramp Rings, and was carried out by the King himself, who went into his private chapel, accompanied only by his Grand Almoner, crawled on his knees to the crucifix, and there blessed a silver bowl full of gold and silver rings. These rings were afterward distributed to people who were afflicted by rheumatism and epilepsy. The idea is supposed to have originated in a certain ring given by a pilgrim to Edward the Confessor, which was kept in Westminster Abbey and used as a cure for such ills.

International Conference on Wireless Telegraphy.

The Berlin correspondent of the Standard states, "on good authority," that the International Conference on Wireless Telegraphy will take place in Berlin about the end of next March or the beginning of April. England, the United States, France, Austria-Hungary, Italy, and Russia have responded to the initiative of Germany in the most friendly spirit, and the majority of these states have now intimated to the Berlin government that they will accept an invitation to such a conference on condition that the



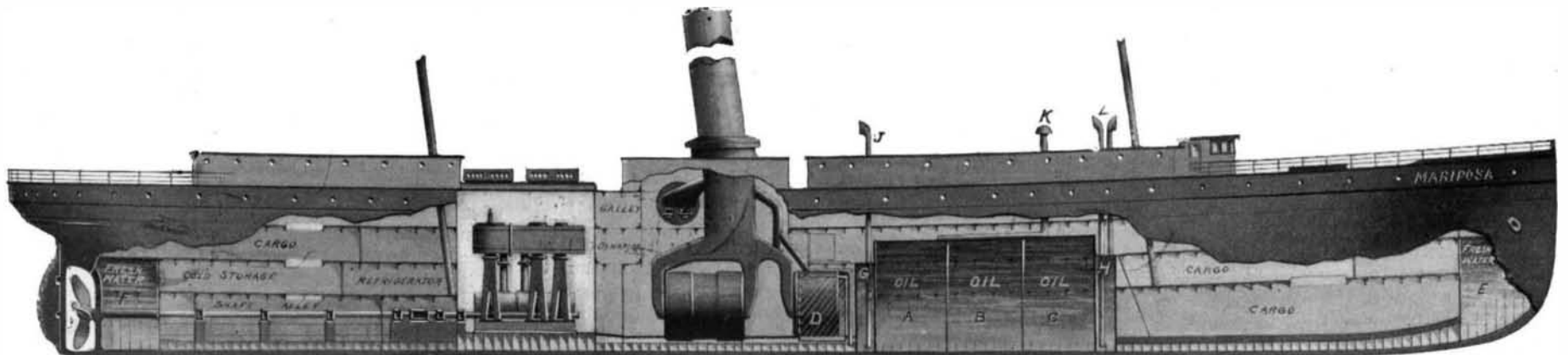
THE NEW EDISON STORAGE BATTERY CELL.

CROSS-SECTION OF EDISON BATTERY CELL.

burning oil. Originally she was provided with two double-end and one single furnace boiler carrying 90 pounds of steam. Her boiler capacity was not increased, but the new ones were calculated for a pressure of 180 pounds to the square inch. In place of her old three-cylinder compound engines, triple-expansion engines, with cylinders of 29 inches, 47 inches, and 78 inches respectively, with 57-inch stroke, were substituted. The repairs were made at the shipyards of the Risdon Iron Works.

The "Mariposa" was provided with six storage and two settling tanks, having a total capacity of 35,588 cubic feet, or 6,338 barrels, located on the port and starboard sides of the vessel. Ventilators of the trunk and cowl type extend from the fireroom and tanks considerably above the main deck. The oil is pumped from the storage tanks into the settling tanks, which are in duplicate, and containing 175 barrels each. From thence it is pumped through a heater, where it is raised to a temperature of 140 deg., and then it is forced through the burners at a pressure of 30 to 40 pounds to the square inch. The air from the receiver is raised to a temperature of 300 deg. by circulating

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A PARTIAL LONGITUDINAL SECTION OF THE OIL-BURNING STEAMSHIP "MARIPOSA."

tery are being made on delivery wagons in New York, after which, we understand, it will be placed upon the market this coming spring. One thing is certain, viz., that in the mechanical make-up of his cell, Mr. Edison has made so many improvements over the usual hard rubber jar as to produce a battery very much cleaner, neater, and safer than any that has yet been made. Even in the simple operation of refilling the cell by the addition of water to replace any that should evaporate from the electrolyte owing to overcharging, provision has been made that the jar should not be filled too full by devising a funnel with a telltale float that indicates when the liquid has reached the proper level.

around a special furnace front, into which it is led by pipes, finally coming in contact with the oil at the burner.

Thus equipped the "Mariposa" made her first voyage from San Francisco to Tahiti and back, covering in the round voyage 6,763 knots. The results were as follows: The average horse power developed was 2,272.75, including 120 horse power for auxiliaries. The average daily consumption of oil was 226 barrels, or 32.28 tons. The hourly consumption was 3,013 pounds. The per horse power consumption, including compressor pumps, was 1,325 pounds. The amount of free air used each minute was 732 cubic feet. The total

programme is fixed beforehand and sent with the invitation. The circumstance that England's official assent to the conference has not yet reached Berlin is mainly attributed to the rather difficult position in which she has been involved by the contract concluded between Lloyd's and the Marconi Company. It is, however, confidently hoped that England will send delegates to the conference, "not only because most of the naval stations are in her possession, but also," says our contemporary, "because it is believed that Signor Marconi's acquiescence in the decisions of the conference will greatly promote the future development of wireless telegraphy."