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ELECTRIC LAUNCHES AT THE COLUMBIAN EXPOSITION.

No electrical feature at the World's Columbian Exposition was entered upon with more uncertainty than fere with regular trips during the day. the introduction of electric launches on the lagoons, as up to this time such launches had not been made use of in this country except in an experimental way. In spite of these uncertainties, however, the launches were among the first electrical features that were ready and they have fulfilled their requirements during the entire period that the Exposition has been open, with gratifying results, carrying over one million passengers and earning \$314,000.

There are fifty of these launches that did service for the public, all of the type shown in our first page illustration. Each boat is 35 feet 10 inches over all in length and 31 feet 6 inches on the water line. The beam is 6 feet 21/2 inches and the draught 27 inches. The lines are as near perfection as they well can be. At whatever rate the launch runs there is practically no wake, so that the wash on the shore, even in such narrow waterways as the lagoons, is of no consequence. The hulls of these boats were constructed of white oak frames, with white cedar planking. The inner paneling, decks and other parts are of mahogany. All the woodwork is finished in its natural color, thus giving a very rich appearance. Cut No. 4 shows the launch complete, with the pilot in the forward end controlling the supply of electricity and steering. The passengers are scattered about, the full seating capacity being 30 people. Cut No. 5 gives an idea of how the launches looked when laid up. Their berths were at the southeastern corner of the Agricultural building, in the South Pond, 30 boats being on the left in the picture and 20 on the right. When the boats were station can be fitted up at little expense, and there is

The charging was all done at night, so as not to inter-

Cut No. 1 gives a sectional view of a launch. It will be noticed that the motor is placed low down and in the center of the boat. This motor was designed and made especially for this use by the General Electric Company for the Electric Launch and Navigation Company, whose offices are at 44 Broad Street, New York City, which holds and owns the patent rights for the launches.

The motor is protected by a box which rises flush with the main deck of the boat, and is so set that all working and wearing parts can be readily reached. The storage batteries are placed around the sides of the boat, under the seats and entirely out of sight. The motor is nominally of four horse power, and is coupled direct to the propeller shaft. The type of this motor is shown in cut No. 3, while cut No. 2 illustrates the thrust ball bearing in which the shaft runs. By this combination of direct coupling and thrust bearing, all gearing and loss of power, as well as unnecessary noise and jar, are done away with.

The batteries used are of the Consolidated Electric Storage Company's type, of 150 ampere hours' capacity. Each boat has 66 cells, and these cells can be arranged in three groups of 22 cells in series or in two groups of 33 cells in series. Several improved devices have been brought out to adapt these cells to this use, so that there shall be no danger of the liquid spilling or of the efficiency of the cells being unnecessarily impaired. The cells are readily charged. The manner in which this is done is shown in the illustration. A charging

to be charged they were laid up here, and whenever probably no lake, river, or harbor in the country with a boat needed repairs it was hauled up in its berth. sufficient water to float a launch where such a station could not be readily had. A current of 18 amperes per

group is the one generally used to charge after a run of fifty or sixty miles at nominal speed, and from six to seven hours time is required. In case of necessity, however, a current of 30 amperes can be used, when the batteries can be charged in four or five hours. The plant which provided the current at the Exposition comprised a direct current shunt-wound Edison generator, giving a current of 110 volts. Any form of electric energy, however, arc or incandescent, can be used. Even when only an alternating current is to be had, a charging station can be arranged with not very great expense. When the station is once completed, all that is necessary is to connect the charging wires to a set of binding posts on the boat, as shown in the illustration, and turn on the current.

The operation of one of these boats is exceedingly simple, as shown by the experience of the Electric Launch and Navigation Company at the Exposition. Not one of the pilots or guards that managed the fleet had ever before handled an electric launch, yet they experienced no trouble whatever from the first. The control is by means of a small lever switch at one side of the steering wheel, which is located in the forward part of the boat. This lever allows of four speeds forward and two backward. The nominal speed at which the boats are run is from six to seven miles an hour, but they have a reserve speed of from eight to ten miles. At the ordinary speed the launches at the Exposition have been in constant use from twelve to fourteen hours a day on one charging, and the cost of this charging has never exceeded sixty cents per day per (Continued on page 343.)



ELECTRIC LAUNCHES AT THE COLUMBIAN EXPOSITION,

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ELECTRIC LAUNCHES AT THE COLUMBIAN EXPOSITION.

(Continued from first page.)

boat. All the electrical parts except the switch are protected, so that there is no possible danger of shock, and there is no report at the Exposition of any mishap of this kind. The boats are operated by a heavy current at low pressure, so that there could be no harm even were it possible for a full charge to be received. No boat could be much more easily managed and be more free from possibilities of mishaps, such as explosion or escape of steam or oil. In addition, the launches are clean and free from all noise, smoke, ashes, and other disagreeable features.

The greatest test the launches had during the period of the Exposition was on Chicago day, when 622 trips, each trip of three miles, were made by the fifty boats. Six of these boats averaged fifty miles each, while twenty of them averaged over forty miles, carrying on each trip about forty people. These long runs did not by any means consume the stored energy, as an experimental test made some time ago run on an average four times the number of miles a on one boat at a speed of a little over five miles an launch owned by a private individual would ordinarily hour demonstrated that it had a storage capacity of cover during a regular season, and that, as all who have making ninety miles at that speed on one charging. Very few accidents have occurred to any of the the operating expenses are decidedly heavier than unlaunches, and nine out of ten have been caused by the der ordinary circumstances, it will be acknowledged propeller becoming entangled in wires or other debris that the cost per launch mile is exceedingly low. in the bottom of the lagoons, and thus springing the Judging from the experience of six months with the making machine would be his salvation. Last year he of wire is shown in the office of the company that and will be, in the near future, brought down to as low was gathered up by a propeller that would require a figure as three cents per electric launch mile where of freezing and preserving twenty tons of fresh fish nearly a bushel basket to contain it. The batteries at least thirty launches are operated under like condihave proved highly efficient. No embarrassing or itions-less World's Fair extra expenses. Though the capacity of the plant. costly breakdowns have occurred, and during the electric launches have carried over 801,000 passengers, entire period of the Exposition there have been only not a single accident has occurred, and it was exceedabout 14 per cent of renewals in spite of the steady ingly rare that a boat had to be towed in, except in the dressing vats, where the refuse matter is removed and uninterrupted work that the launches have been through injury to the propeller or shaft by the floating called upon to perform.

An economic feature of the electric launch that has been demonstrated at the Exposition is the fact that the instant the motor stops the expenditure of energy ceases, and after a boat has lain idle for many perties of Fluorine by Moissan's Method," by Mr. is a sort of a vault filled with pipes arranged in tiers days its maximum power is to be had upon a mo- Moissan's assistant, Dr. Meslans, was the popular and compartments like the shelves of a pantry, and ment's notice and without any waiting to fire up and event of the proceedings in the chemical section of the made to fit so perfectly that no space is wasted. get up steam. By placing the motor and storage recent meeting of the British Association, and is de- These pipes are filled with freezing fluid and the tembatteries low down, they aid to properly ballast the scribed by Engineering as follows: Some years ago perature is kept at zero. From here, after freezing boat, and at the same time they provide nearly 50 per Mr. Moissan isolated fluorine, which so far had baffled twenty-four hours, the pans are removed to the precent more space to accommodate passengers than is all attempts at separation, and in a measure remained 'serving vaults, where they are placed on pipes arranged to be had on the ordinary steam or naphtha launch of a hypothetical element. Dr. Thorpe, of South Ken- as in the first mentioned vaults. equal size

pump, which has been used on each one of the boats lievers. Fluorspar is decomposed in a platinum retort of the fleet during the Exposition.

features at the Exposition, and they have more than drofluoric acid is an insulator, and resisted all electro-separated. fulfilled the expectations of them. The contrast be-lytical attacks until Fremy suggested the addition of ducing these boats in the "City of the Doges." Such an innovation is startling, and yet this syn-Fair fleet, with the privilege of purchasing more if it appear so vicious as it has been described, soon set the wishes.

Under ordinary circumstances, boats finished as beautifully and equipped as completely as these Ex- fluorine at once decomposes, with the moisture in the of this fleet has been disposed of at \$2,000 apiece.

Scientific American.

	Therefore the general average of miles per launch, per day,
2057 14	Minimum miles, per launch, per day
37 7 2 54	Maximum miles, one launch, one day
801,000	ber 1
464	Maximum passengers carried in one day by one launch Maximum number of people carried by one launch for one
40	round trip
	Operating Cost.
551/3c.	Average cost per launch, per day, for charging, at 3 cents per electric horse power

shafting, propellers, 54 motors, 162 packing boxes, 3,524 storage batteries, including labor for charging, 54 controllers-all the above being gone over every 24 hours... 43c. Renewals of batteries, per launch, per day..... 41c. Renewals and repair material for all else, per launch, per 9c. day.....

Total cost per launch, per day..... Average cost per launch mile for labor and material, exclu-... \$1.481/2 sive of office expenses..... 5%c

When it is understood that already the launches have been connected with this glorious Fair will vouch for, and sunken debris in the lagoons of the World's Fair.

----Fluorine.

The "Demonstration of the Preparation and Prosington, failed in the repetition of these experiments, The question of a proper kind of signal came up which were doubted by some chemists. At the re-

tween these launches and the gondolas, which have a fifth of fluoride of potassium. The U-tube stood in frozen at such a low degree of temperature will remain also plied on the lagoons, was so marked that a syndi- | a cooling vessel of about a quart capacity, containing perfect for a period of years, and it is believed that the cate of Italians purchased a launch in September condensed methyl chloride, which reduces the tem-fish may be preserved ten years, and then be turned and forwarded it to Venice with a view to intro- perature to -23° Cent. As soon as the current of 70 over to the fish dealer fresh as the day they were caught. volts and 25 amperes was turned on, minor explosions Brine is circulated by the pumps through every foot were heard, and fumes began to issue from the fine of the pipes, and returns to the tank for cooling for redicate is so certain of its proving a success that it has platinum tube through which the fluorine was to es- distribution in the space of one minute. The Sandusky taken an option of twenty-five launches of the World's cape into the air. It did so; and, although it did not plant cost \$25,000. Detroit Journal. Interesting Rail Tests. crowded audience coughing and longing for fresh air. Nobody was any the worse for it, however. As the In tests conducted at the Watertown arsenal it has been found that old steel rails when submitted to a position boats sell for \$2,700, without extras, but most air, into hydrofluoric acid and ozone, these two sub- bending test in which the head of the rail is put in stances were practically what was smelt and felt; am- tension and the base in compression, will invariably The following extract from the report of the engi-monia was passed round instead of eau de Cologne. fracture, making a clean break across the rail, while if neer in charge shows that the cost of maintaining an The experiment had to be temporarily interrupted the same rail is turned over and the head put in comelectric launch of average size is less than six cents a after some minutes, as the stock of methyl chloride pressionit will bend without fracture. Again, if before mile. The report does not include the month of Oc- gave out; Mr. Meslans had been experimenting the conducting a test, about 1-16 in. of metal is planed off day previous. The low temperature is necessary on the head of the rail, there will be no fracture, no matter Believing that a concise statement of the actual account of the high volatility of the hydrofluoric acid. which part of the rail is in tension. But if, in planwork and operating cost of these launches will be of As, however, some of the potassium salt, carried over ing this head, care is not taken to remove 1-16 in of deep interest to the electrical fraternity, since the by the violence of the reaction, stops up the discharge metal from the corners as well as the top of the head. the launches are operated under novel and severe condi- tube, which is the size of a clay pipe stem, Dr. Meslans rail will fracture as before. The explanation of the tions, the writer presents the following data, which was constantly applying his Bunsen to heat the tube. matter is that a thin layer of metal on the head of the are computed from records carefully kept from the lodine at once combined with the fluorine under ex- rail has been greatly hardened by the contact and plosion; sulphur burned with its well known blue pressure from the wheels passing over it, and fractures flame; phosphorus as in oxygen; silicon and boron when put in tension. When once started, the fracture, glowed like burning coal; carbon itself would not of course, extends entirely across the rail. If this hard catch fire. It does so under proper conditions. On material is removed, the fracture cannot make a start, the motion of Sir Henry Roscoe, the thanks of the and the head of the rail is as good as the base. association were conveyed to Mr. Moissan by wire. Dr. Thorpe said that Mr. Moissan had been kind WE are indebted to Mr. J. N. Knowlton, manager of enough to examine his apparatus, which he had sent the Steam Whaling Company, San Francisco, for the over to Paris; but that he, however, had not been information that the reported sailing of one of the able yet to repeat the experiment. On the request of company's vessels to a point further north than the president, he gave a summary of the properties of Greely's expedition reached is incorrect. The furthest the now fairly settled refractory element. It attacks north the company's ship made was between 72° and everything-even the platinum-iridium electrodes. As 73°.

to its appearance, even Moissan can hardly speak, as it cannot be brought into transparent vessels, and fumes so badly. It seems to be a greenish-yellowish gas, like chlorine. Its atomic weight Moissan has determined by filling two exactly equal platinum jars with nitrogen, and replacing in the one the nitrogen by fluorine; since the atomic weights of nitrogen (14) and fluorine (19) do not differ much, however, this determination is not very reliable. Mr. Meslans also exhibited one of Moissan's latest products, uranium carbide obtained in his electrical furnace. This is a dull blackish mass, which, when shaken in the stoppered bottle, sparks most energetically; the carbide, or its combustion product, has a peculiar smell.

Freezing Fish.

Science has conquered nature and has demonstrated that to preserve fish it is not necessary to salt them. Freezing is the thing in the future, and Sandusky, Ohio, is the place where the first attempt has been made to carry on the business in a general way. Frozen fish are taking an important place in commerce and in the cuisine, and as the industry becomes more general the demand for salt fish will probably drop off to a great extent.

About three years ago A. J. Stoll, a fish commission dealer in Sandusky, began to experiment with freezing fish, and soon found that the invention of the iceshaft or bending the propeller blades. One bunch fifty-four launches, the writer believes the expense can completed his scheme and now he has a plant in full operation, employing twenty-five men and a capacity each year. In a year Mr. Stoll expects to double the

The method used is very simple, yet interesting. The fish are unloaded from the schooners and placed and the fish sorted and graded according to the species. This is only done with the larger fish, but the small ones are not mutilated. The fish are placed in pans made of metal that will not rust, being placed in layers and the pans carried to the cooler. This cooler

Just step in once, after standing around in the hot sun of a July day. Of course overcoats are neglected for consideration before the Exposition opened. At quest of Professor Emerson Reynolds, Mr. Moissan, re- in the summer, but in two minutes you discover your first an electric whistle was used which was a French gretting his inability to come himself, sent over his self in the atmosphere of the Arctic regions, and, glancinvention. This was a device in which a diaphragm assistant with the full plant, which was exhibited. ing at a thermometer, you will see the mercury regiswas caused to vibrate by electric energy, but it was Mr. Meslans contented himself with demonstrating, tered at eighteen below zero. A massive door is opened more expensive and did not give as much volume making brief remarks in French, and converted all and before your eyes is a big stack of block wood—no of sound as the simple air whistle operated by a hand doubters, if any were present, into enthusiastic be-things are what they seem, for you find the wood very cold. It is the fish that will be distributed to your by means of sulphuric acid, and the anhydrous hydro- market man, perhaps many years hence, and the meat The Electric Launch and Navigation Company is to fluoric acid, dried and purified, brought into a U-tube is so frozen that when emptied from the pans the fish be congratulated upon the success these launches have | for electrolytical decomposition. The vessels and tubes appear like chunks of wood, and are so solid that they attained. They have been one of the most attractive are of platinum; the stoppers of fluorspar. The hy- must be thawed several hours before the fish can be

It has been demonstrated already that flesh kept

tober. If it did, it would be still more favorable.

beginning of this unique business enterprise:

APRIL 13 TO OCTOBER 1, 1893. Mileage and Passenger Traffic.

Passenger trips of three miles each	47,787
World's Fair special launch trips	6,750
Special trips of regular launches	1,220
Trial trips	270
Experimental trips	180
Total number of trips	56,207
Total number of trips At three miles per trip, total miles	56,207 168,621
Total number of trips At three miles per trip, total miles Average miles per launch to October 1	56,207 168,621 3,122
Total number of trips	56,207 168,621 3,122