THE ENGINES OF THE NEW YORK EDISON POWER STATION.

There has lately been opened another of those great electrical generating stations which are becoming such a notable feature among the power plants in this city. It has been constructed by the New York Edison Company, and in its general arrangement it follows broadly the plan adopted in the Metropolitan Street Railway Company's power house and that of the Manhattan Railway Company; that is to say, the power house consists of one great rectangular building, with a division wall running longitudinally through its center and dividing it into a boiler house and engine room. The rated capacity of this plant when it is completed will be 85,000 horse power, and its maximum capacity 128,000 horse power. The power house lies between 38th and 39th Streets, First Avenue and the East River. It extends 197½ feet between the two streets named, and has a length of 272½ feet. The division wall is so placed that it provides a boiler house 79½ feet in width, and an engine house 118 feet in width. In the boiler house are 56 Babcock & Wilcox boilers of 650 horse power each, which are carried upon two separate floors. The working pressure is 225 pounds to the square inch, and all boilers are equipped with the Roney mechanical stoker, the hoppers of which are fed direct by means of chutes from a huge coal storage bin, which extends the whole length of the boiler house, and is located immediately below the roof of the building. This bin has a capacity of 10,000 tons of coal, and it is loaded automatically by means of conveyors which bring the coal direct from barges at the company's pier on the East River.

A striking feature of this plant is the four huge steel-plate chimneys. These stacks are 17 feet in inside diameter and measure 200 feet in height above the grate bars. They are built of steel with an inner lining of brick, and the weight of each chimney complete is about 500 tons. The thickness of the steel shell varies from ⅝ of an inch in the lower portion of the chimney to ½ inch at its middle section, and ⅜ of an inch in the upper third. Firebrick is used for lining the lower third, and red brick for lining the upper two-thirds of the chimney.

In the engine room, when the whole plant is completed, there will be no less than sixteen Westinghouse-Corliss engines of 8,000 indicated horse power. These will be arranged in two rows, extending the full length of the building, with an open passageway between them. With 175 pounds steam pressure, and at 75 revolutions per minute, the most economical capacity will be about 5,500 indicated horse power; but the maximum capacity will be 8,000 horse power. The engines are of the compound, vertical, three-cylinder type, working upon three cranks, with the high-pressure in the center and the two low-pressures on the outside. They are direct-connected to the generators, the latter being placed toward the inside of the building and adjoining the central passageway, which extends from east to west through the building. The crank-shaft is built up in three forged sections, with a 10-inch axial hole which is reduced to 8 inches where the shaft enters the cast-steel crank-cheeks. The cranks are set at angles of 101, 133 and 126 degrees, with the idea of securing as perfect a turning moment on the shaft as possible. The stroke of the engines is 5 feet, and at 75 revolutions per minute the piston speed will be 750 feet per minute. The steam is led to the high-pressure cylinder of 43½ inches diameter through a 14-inch throttle valve. It passes thence to a reheating receiver, which is about 4¼ times the displacement of the high-pressure cylinder and 7-10 the combined displacement of the two low-pressure cylinders. From the low-pressure cylinders, which are 75½ inches in diameter, the steam is led by 26-inch mains to the condensers, of which there is one to each engine. They are of the surface type, and in each of them are 3,752 ¾-inch brass tubes, 12 feet 9⅛ inches in length, which give 9,200 square feet of cooling surface.

A remarkable feature about these engines is that they are the first large engines built in this country to be equipped with poppet valves, which were adopted because of their suitability to the use of superheated steam, the poppet valve lifting from its seat without any rubbing friction and being, therefore, but little exposed to the difficulties of lubrication which ordinarily occur with the use of superheated steam. The low-pressure cylinders are fitted with double-ported valves of the Corliss type. The steam and exhaust valves are driven by separate eccentrics, which are mounted upon a lay shaft which is carried in bearings attached to the first gallery. This shaft is driven from the main shaft by spiral gears, the vertical shaft of this transmitting mechanism being carried upon a ball-bearing and serving to operate the governor from its upper end.

The speed of the engine can be varied any time by mechanical adjustment at the governor, made while the engine is in motion. There is also an electrically-operated mechanism by which the speed can be controlled from the switchboard, for synchronizing the alternators that are operated in parallel. We are indebted for our information to Westinghouse, Church, Kerr & Company, by whom these fine engines were installed.

Engineering Notes.

An interesting experiment in connection with submarine fog-signaling has been carried out at Egg Rock Lynn, England. A bell was hung 50 feet below a buoy, moored in 15 fathoms of water, and was struck by electricity from the Egg Rock Light Station, where a power house is established. By means of such submarine signaling it is stated that a person placing an ear against a rod held in contact with the hull of a vessel, is able to hear the bell from three to five miles away; in fact, it is believed that the ringing of the bell can be heard at a distance of ten or twelve miles.

The baggage-handling methods of the European railroads have long been the butt of ridicule, but there are a great many features of the system now in use at the new Quai d'Orsay station of the Orleans railroad in Paris which are ahead of anything in the United States. Trunks and packages are available almost instantly on the arrival of trains. For the purpose of handling the pieces quickly there are ten inclined chutes in combination with moving platforms which carry the baggage directly from the train to the delivery room. The system is capable of handling almost everything in the shape of baggage which is ordinarily encountered, but for large pieces there are also several elevators available.

The shipbuilding industry of Great Britain has not enjoyed such a lease of prosperity as it is experiencing at present for several years past. The yards of the Clyde, Tyne, and other centers are so full of contracts that work is being maintained at the highest pressure to cope with the orders. Several large liners for the various leading steamship companies of the country are on the stocks, and the new orders are accumulating so rapidly that several new shipyards are to be constructed in various parts of the country to enable the work to be executed expeditiously. On the Clyde four new liners for the Peninsular and Oriental Steamship Company are being laid down. The White Star, Cunard, American and several foreign lines have commissioned new vessels, while the demand for freighters is almost unprecedented. At the close of the last quarter 477 vessels, representing 1,500,000 tons, were under construction, an increase of 100,000 tons upon the previous quarter, and 200,000 tons increase upon the corresponding quarter of last year.

In Great Britain a National Industrial Association is being established for the promotion of British trade and commerce and the recognition of arbitration in trade disputes. The idea is being attended with considerable success in every part of the United Kingdom. As may be easily supposed, the organization of such a huge undertaking entails an immense amount of work, and will yet take some little time to get into working order. The objects of the association regarding trade disputes where strikes or "lockouts" threaten or exist will be to organize and focus public opinion, so that the parties will be compelled to accept an arbitration award. The association will equally represent masters and men, and will appoint impartial arbitrators with authority to investigate disputes and to publish reports, laying the blame on the right shoulders. The arbitrators may be called in by either party, and if one side elects to give evidence the other can abstain at the peril of losing its case. If neither party desires arbitration the arbitrators can nevertheless secure information and publish a report for the information of the public. By this means an aroused and instructed public opinion will enforce submission.

W. F. Singer, of New York, is the inventor of an automatic pump for automobile use in which the vertical motion of the body of the carriage is utilized to actuate a series of pumps for supplying water to the boiler and air to the gasoline tank. The pistons of the pump are pivotally connected to a pivotally attached vertical post, forming a toggle joint of which the point of attachment to the vertical post is the elbow. The pumps are so spaced apart that the pistons of each are at the end of their respective strokes when the toggle-joint is fully extended, so that a movement of the vehicle body either up or down from its normal position drives the pumps. By pivoting the vertical post to its attachment danger to the pumps from a sidewise lurch of the vehicle is obviated and the action of the pumps is equalized.

An idea of the inroads, present and prospective, which the American automobile is making and will make in foreign territory may be had from the fact that during the present year an exhibition composed entirely of motor vehicles designed and built in the United States will be held in the Crystal Palace, London.

Electrical Notes.

In spite of its enormous size the Cathedral of Notre Dame in Paris has hitherto been simply lighted by wax candles, as gas, it was thought, would damage the walls and valuable paintings. Now we understand that it is about to be electrically lit. The cost of installing the electric light is estimated at $90,000.

From the latest reports from Nyassaland it appears that British Central Africa is in a fair way to become an industrial colony soon. The most recent move in the development of the country is a concession which has been granted by the imperial government for the construction of a line of railway from Chiromo to Blantyre, connecting the center of the coffee plantations with the coast by way of the Shire and Zambesi rivers, says the English Electrical Engineer. Operations are expected to begin toward the end of the year, and will probably last for two years or so. Meanwhile, it is stated, experiments are being conducted with a line on the monorail principle, and it is also intended to establish a system of motor trolleys and traction engines for transport work in the protectorate.

In a recent article the Echo des Mines et de la Metallurgie says that three electric furnaces of 500 horse power each have been erected in the valley of Camonica, northern Italy, for the manufacture of pig iron under the Stassano patent. In these furnaces the electrodes are placed at the bottom of the boshes. In the operation of the furnaces the ore is first pulverized; a sample is then analyzed for the purpose of calculating the amount of carbon required to perform the reduction, as well as the necessary amount of fluxes. The quantities of carbon, lime or silica thus determined are pulverized and mixed with the ore. The material is then briquetted, after adding five to ten per cent coal tar, and is ready for charging into the furnace. By means of the heat developed around the electric arc, the iron ore is decomposed, the oxygen uniting with the carbon to form CO_2. The latter gas ascends into the upper part of the furnace, where it effects a partial reduction of the ore. To obtain a ton (metric) of metal, 3,000 horse power hours are said to be required, costing about 18 francs.

A curious solution of the telephone relay problem is offered in a patent granted October 15 to one Bela Gati, of Temesvar, Austria-Hungary, says the Electrical World. The inventor connects one winding of each of two repeating coils by a circuit containing a generator and an arc lamp, which may be either in series or in parallel with the windings of the coils. The theory is that the weak telephone currents traversing the transmitting circuit, act by induction upon the lamp circuit and cause corresponding increase and decrease of current therein, which in turn will cause the carbons of the lamp to vary in their separation, thereby decreasing the resistance of the lamp circuit and increasing the supply of current from the lamp supply circuit. This amplified current will correspondingly reinforce an induction coil in circuit and send out to the receiving telephone much stronger impulses than were created by the voice in the speaking circuit. This is certainly a strikingly bold attempt at the telephonic relay problem, but it would require a delicacy in carbon feeding mechanism difficult to attain, to say the least, while in practice the arc lamp circuit, through its normal fluctuation, would have something to say for itself with rather a disturbing effect on telephone currents.

The opening of the Paris underground railroad—or something else—seems to have had a disastrous effect on the other transportation enterprises of that city. Until very lately there was little street railroad in Paris, but an omnibus system, worked by a single company, which, with transfers, covered the whole city, and was perhaps the most complete and efficient omnibus system the world has ever seen. On the eve of the 1900 World's Fair not only was the Metropolitan (underground) railroad built, but a considerable extension of street car lines was made, says the Railroad Gazette. It seems that a great deal of water was injected into the stock of most of the new enterprises, and naturally they have made short work of a large part of the omnibus traffic, which is hardly a twentieth century institution. The result, as interpreted on the Paris stock exchange, is seen by the quotations for shares in October this year and last. Omnibus Company shares have fallen from 1,660 francs to 780; Thomson-Houston Company from 1,290 to 814; other tramway companies from 730 to 500, from 355 to 250, from 474 to 147, and from 590 to 345. On the other hand Metropolitan (underground) shares have risen from 533 to 574, and Parisian Electric from 252 to 261. Doubtless several of the street railroad companies whose shares have fallen so greatly are yielding good interest on the capital actually invested in them, and Omnibus Company shares, worth 1,660 last year and 780 this, are 500-franc shares; but this does not mitigate the fall to those who bought last year.