

GAS ENGINES FOR ELECTRIC LIGHTING PLANT.

In connection with the new station, and the extensive alterations recently carried out at Leicester, the Midland Railway Company has put down the largest and most efficient electric plant driven by gas engines in this country. We are enabled to give an illustration of the engine and dynamo room, and also a few particulars of the plant. The motive power consists of four large gas engines and two smaller, and are all made by Crossley Brothers, of Openshaw, Manchester. They are all built on their well known lines, and are specially fitted for driving dynamos with the necessary steadiness. Each of the four large engines is of 25 nominal horse power, capable of giving off 40 brake horse power as a safe working load with Dowson gas; and instead of the two overhung flywheels usually employed, one heavy flywheel, 7 feet 6 inches diameter by 19 inches wide, and weighing 4 tons 5 hundred-weight, is fitted on each engine, with a massive out-end bearing and pedestal for supporting the end of the shaft. The engines run at two hundred revolutions per minute, and with the means adopted very great steadiness is obtained. The face of the flywheels is slightly rounded, and the dynamos are driven direct from it. The crankshafts are cut out of solid steel forgings and are machined and polished all over, thus adding materially to the appearance of the engines. As is usual in all the engines made by Messrs. Crossley Brothers,

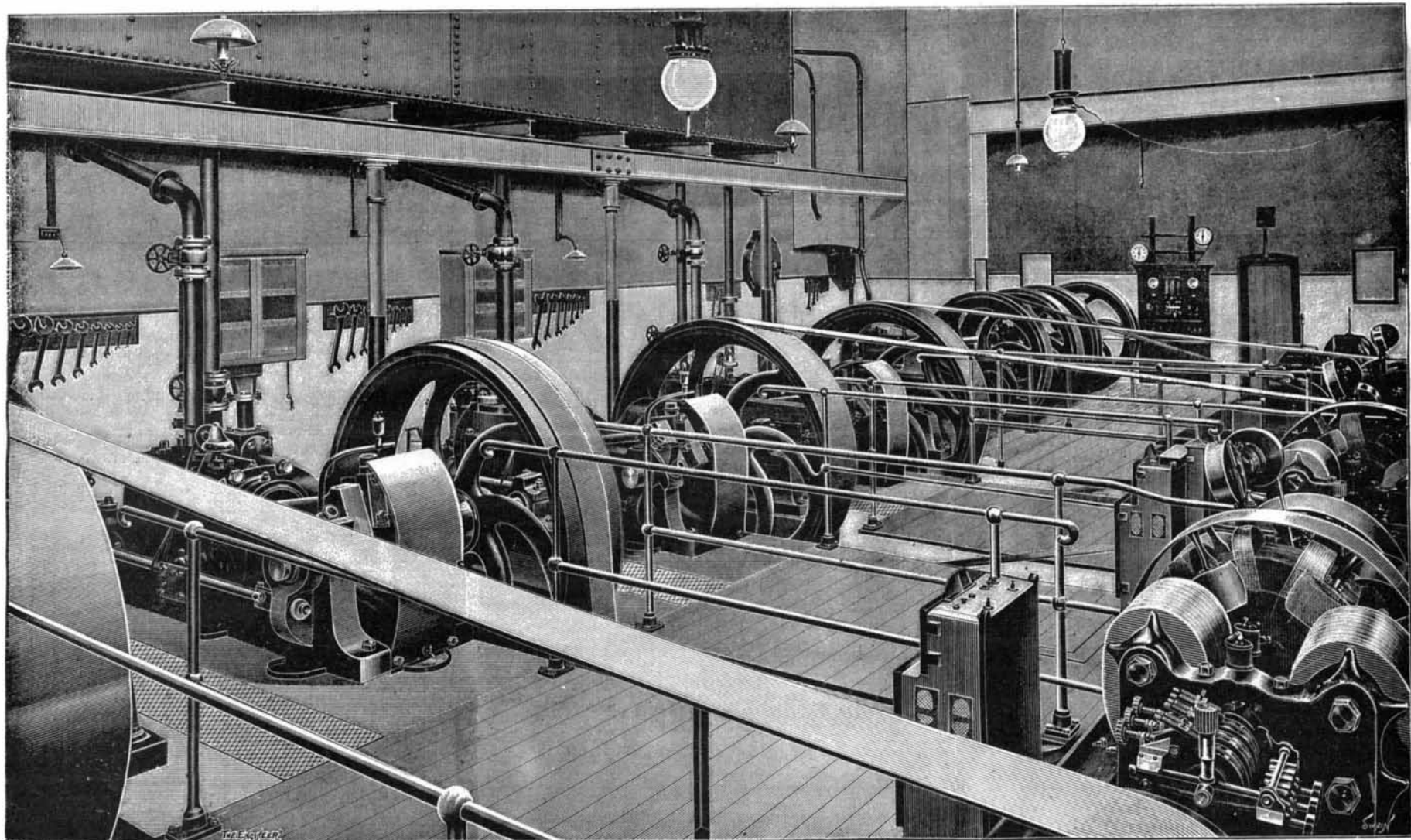
tions per minute. Each engine is fitted with governors used for electric lighting work, and is generally on the lines of the larger engines previously described. Although the heavy flywheels militate against the efficiency of the engines, it costs less to store up the necessary energy to insure steady running by increasing the flywheel power of the engine than it would to achieve the same result on the dynamo.

For the jacket water for these engines one large tank is fixed on columns and girders, and contains sufficient water for cooling the cylinders of the engines even if all were working at once. Under ordinary circumstances the engines are worked with Dowson gas, but arrangements are made whereby, in the event of anything being out of order with the gas plant, the engines can be immediately turned on to coal gas from the town's mains. Three of the four larger engines are connected to Brush series arc-lighting machines, capable of driving fifty 2,000 candle power lamps each; the fourth large engine driving an incandescent machine of 300 amperes. Each of the smaller engines drives a small machine for incandescent lighting, giving an output of 125 amperes at 115 volts. The arc lighting is required for the goods yards and sheds belonging to the Midland and London and Northwestern Railway Companies, and for the platforms, etc., of the new passenger station. The incandescent lighting is employed for the refreshment rooms, dining rooms, and offices.

Misfortunes of Birds.

I have noticed in a New York paper an account of a strange misfortune that happened to an English sparrow at the building of the Edison laboratory, Orange, N. J. The bird became entangled in a twine used in the construction of its nest, and met its death by hanging. This has reminded me of a similar incident that occurred to a bird last summer, near Bowling Green, Ky. It was a common or crow blackbird, and was seen hanging by the neck from the limb of a tall tree overhanging the road. Whether in flying with a long grass or string it became entangled with it or in what way it got caught in the noose and met its death, is a matter of conjecture. A queer incident of a woodpecker has come under my notice. The bird, a hairy woodpecker, was seen on a tree trunk, and though a stone was thrown toward it to see it fly, it remained in the same position. On going nearer, it was found that the bill had been driven into the tree with such force that the bird could not extricate it, and had hung there, meeting a miserable death.

I have heard from a friend of an interesting life history of a mocking bird. It was quite a young bird when purchased from a negro bird catcher, and it was soon discovered to have sore feet. These were swollen twice the natural size, and though efforts were made to relieve this, it was only after it had lost several of its toes—two front toes on one foot and one on the other



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the cylinders are fitted with loose liners, made like the pistons of specially hard metal, so that when they are worn beyond the stage at which reboring is possible, they can be renewed at the smallest possible cost. Owing to the high speed at which the engines run, special attention has been paid to the bearings, and to all the parts of the engines, with a view to easy maintenance and facility of renewals at the least cost.

As it is essential that when once started the engines should run without intermission until their work is done, automatic lubricators have been fitted to all the vital parts. A novel feature in connection with these engines is the new igniting arrangement recently brought out by Messrs. Crossley. Instead of the metal tubes, which are short lived, Messrs. Crossley now use a short porcelain tube, about 3 inches long, which, if not destroyed by careless handling, is imperishable. It is quickly heated, thus reducing the time required for starting after the burner is lighted to about a minute and a half, besides being low in first cost. The engines are started by Crossley's self-starting apparatus, which enables an engine to be set in motion with nearly half load on. Thus fast and loose pulleys on the dynamo, or on other machinery the engine has to drive, are rendered in many cases unnecessary.

The two smaller engines at Leicester are each of 14 nominal horse power, capable of working up to 25 brake horse power with coal gas, and are each fitted with two overhung flywheels running at 200 revolu-

The Dowson gas plant is placed in a separate building adjoining the engine house. There are two gas generators, and each has a gas cooler, hydraulic box-coke scrubber and sawdust scrubber. Space has been left for a third set, which has not yet been supplied. The gas holder is 16 feet diameter by 10 feet deep. There are two small vertical boilers, but only one is used, the other being in reserve. We have no recent data as to the working, but we may mention that toward the end of last year they were working three 25 horse power and one 14 horse power from 5 P. M. or 6 P. M. to 10 P. M. or 11 P. M., and that one generator made gas enough. From 10 P. M. or 11 P. M. to 5 A. M. or 7 A. M. there were two 25 horse power and one 14 horse power, and during this time the production of gas was reduced to suit the smaller load. At that time all the arc lamps were not fixed, but when the full number is on the two generators will be worked, one of them being stopped during the hours of light load. The generators are fired with anthracite coal and the boiler with common boiler slack.

The whole installation, which is very complete in every detail, has been carried out under the supervision of Mr. W. Langdon, superintendent of the telegraph department of the Midland Railway Company, and is a fine example of a modern electric light plant, in conjunction with gas engines and producer gas.—The Engineer, London.

—that the feet were finally healed. After this it moulted, losing about all its feathers at one time. Its eyes then became inflamed, and the eyeballs like drops of water, finally closed and the bird became totally blind. In getting its food it would stand at one side of the cage and follow the wires till it reached the food, it would then follow the side of the cage till it reached the water. It soon learned, however, to gauge distances, and would fly to the perch without fail. It was a pitiable object, but strange to say, this poor maimed bird, lame and blind, developed into one of the finest of singers!—Sadie F. Price in Amer. Naturalist.

Bordeaux Mixture.

W. T. Swingle (Jour. of Mycology) states that copper sulphate may be dissolved with steam; the stock solution should contain two pounds of copper sulphate to a gallon. The color of the mixture should be deep sky blue. The clear liquid after settling gives no brown color with potassium ferrocyanide solution, but does give a slight precipitate of light bluish color with copper sulphate solution. The addition of soap to the finished mixture greatly increases its wetting properties and adds to its value for all plants with waxy coating on the parts sprayed.

THE skeleton alone of an average whale weighs twenty-five tons.