

shops in Montreal. The rate was 50 cents per lamp per night from dark to midnight, or over £35 per lamp per annum. At Philadelphia the Brush system, employing 1,200 horse-power, supplied electricity for nearly 1,000 lamps, for which £60 per lamp per annum was the charge. The Brush people had also two central stations at Boston, lighting up 816 arc lamps; in fact, there are few towns of any consequence in the States that did not possess central stations worked by the Brush Company, and probably there were 25,000 Brush arc lamps in use in the United States. At Chicago all the drives in the Lincoln Park were lighted by arc lamps with very good effect, especially on the unique drive skirting the shore of Lake Michigan. Other companies also had central stations in Chicago. He did not see in the States one single instance of street lighting by glow lamps. In every case arc lamps were used for this purpose, and they were usually fixed on much taller posts than in England. Although brilliant, the effect was by no means perfect, and no effort seemed to be made to distribute the light uniformly, as had been done in England by Mr. Trotter. The price paid in New York was 70 cents per night, or £50 per annum, for each arc lamp; a fine of about 6s. for each time any lamp was reported out was inflicted.

Turning then to methods of incandescent lighting, he remarked that these did not seem to have flourished so much as arc lighting, nor indeed had they been applied to private houses to the same extent as in England. The principal system in practical use was that of Edison. House lighting had been attacked principally by the Edison Company. They had a central station in New York, which was opened on the 3rd Sept., 1882, and from that date to the time of Mr. Preece's visit there had been only two hours and a half stoppage, and that due solely to carelessness. There were 587 subscribers, using altogether 12,764 lamps served day and night. The price charged was the same as that which would be paid if gas were supplied at 7s. 6d. per 1,000 cubic feet, the price of gas having now been reduced to 5s. 9d. The use of secondary batteries had not received so much attention as on this side of the water. No difficulty was found in determining by the Edison meters the charge to be made, the subscribers paying for the light they received and not for the current they used. These bottle measurements were unquestionably accurate within one per cent.

At present the electric light in England must be regarded as a luxury, and must be paid for as a luxury, but there was no reason why it should remain a luxury. Pointing out improvements in dynamos and lamps which had already effected a reduction of cost, he observed that there was still vast room for economy, and it was clear that the prices now required to make electric lighting pay would be brought down. Even now it was possible in England to make a system pay at the rate of a half penny per glow lamp per hour. In conclusion, he spoke of the influence of electric street lighting upon the morality and safety of the public. The Chief of Police of New York had gone so far as to say that "every electric light erected means a policeman removed."

In a discussion which followed, Mr. Crompton gave reasons for believing that with regard to steam engines, dynamos, and lamps, and consequent economy and efficiency, we had little to learn from the United States. Professor G. Forbes spoke of the important element in the question of the experience gained in the United States in the supply of the current from central stations. Mr. Hammond, agreeing that in point of quality arc lighting was better done in England on the whole than in the United States, said the love of the electric light there was to be measured by the commercial instinct of the consumer.

The chairman, in closing the proceedings, pointed to the unfair conditions of an Act of Parliament as the true reason why electric lighting from a central source had not been developed in this country. The thing had been done with the express purpose of stopping the introduction of electric lighting from a central source, and only a strong expression of public opinion would remove this unreasonable obstacle to a great improvement.

TANNEKAYA bark, a new agent used in tanning leather is, to some extent, imported from New Zealand, the cost of the bark there and the freight bringing the price up to about \$80 per ton. It is thought that this tree would grow in the Southern States if transplanted. It is a beautiful tree of the fir species, and its timber is said to be valuable.

## ROLLING MILL ENGINES.

Our double-page illustration this month illustrates two pairs of engines constructed by Messrs. Davey Brothers, Limited, of the Park Iron Works, Sheffield, for the rail mill of the Tredegar Bessemer Works. Fig. 1 shows the reversing cogging mill engines and Fig. 2 the rail mill engines. In the former the cylinders, which are overhung, are 40 in. in diameter and 5 ft. stroke, and are fitted with balanced slide valves worked, through reversing links of the Allan type, by eccentrics fitted to separate shafts and driven by drag links from the main cranks. The reversing is effected by a steam cylinder fitted with suitable controlling gear, so arranged as to dispense with the usual oil cataract. All the starting handles are brought to an elevated platform erected over the centre of the engine, so that the man in charge has a complete view both of the engine and of the rolls.

The cranks are of cast steel and have the counter-weights cast on. The crankshaft is of best wrought scrap iron, 16 in. in diameter in the journals and 20 in. in the middle. The second motion shaft is also best wrought scrap iron, 20 in. in diameter in the bearings and 24 in. in the middle. The spur gearing has a ratio of about 2 to 1; it is 8 in. pitch and 24 in. wide at the points of the teeth. The total weight of the engines is about 140 tons.

The engines designed for driving the finishing rolls have cylinders 48 in. in diameter, and 4 ft. 6 in. stroke. They are overhung and fitted with balanced slide valves driven by eccentrics through reversing links of the Allan type. The reversing is effected, as in the previous case, by a steam cylinder fitted with suitable controlling gear, so arranged as to dispense with the usual oil cataract.

The crankshaft is 18 in. in diameter in the journals; its extreme length is 20 ft., and its weight upwards of 13 tons. It is made in halves, bolted together in the centre, the flanges being used for carrying the balance disc. The height from the foundation to the centre of the crankshaft is 4 ft., and the total weight of the engines about 150 tons.

Messrs. Davey Brothers supplied the first set of their rolling mill engines about five years ago to Messrs. Wilson, Cammell, and Co., of the Dronfield Works, and these are now being removed to Workington. They have since their erection rolled about 2,500 tons of finished rails per week on the average, without any stoppage for repairs. The other engines and rail plant in connection with these works were also constructed by the same makers, who have supplied similar engines to Messrs. Bolckow, Vaughan, and Co., Messrs. Steel, Tozer, and Hampton, the Tredegar Iron and Coal Company, the Barrow Hematite Steel Company (two pairs), also the Swanton Steel Company in America, and they are now building another pair for a Middlesbrough firm for rolling large angles and tees.

We may state that a modern rail plant, consisting of cogging, roughing, and finishing engines and mills, will turn out 3000 tons of rails per week with ease, whilst formerly 700 to 800 tons was considered a splendid week's work.—*Eng.*

## THE WORLD'S TELEGRAPH.

The telegraph appears to have made more progress in the United States than in any other country. The number of American telegraph offices in 1882 was 12,917, and the number of telegrams forwarded during the year was 40,581,177. The number of telegraph offices in Great Britain and Ireland in 1882 was 5747, the number of telegrams forwarded being 32,965,029. Germany had 10,803 offices, the number of telegrams forwarded being 18,363,173. France had 6319 offices, the number of telegrams forwarded being 26,270,202. Russia had 2819 offices, the number of telegrams forwarded being 9,800,201. Belgium had 835 offices, the number of telegrams forwarded being 2,830,186. British India had 1025 offices, the number of telegrams forwarded being 4,066,843. Spain had 647 offices, the number of telegrams forwarded being 2,032,603. Switzerland had 1160 offices, Italy 2500, and Austria 2696. The number of telegrams forwarded in these three last-mentioned countries was 3,046,182, 7,062,287, and 6,626,203 respectively.—*Ex.*

The manufacture of needles and pins is one of the most flourishing industries in Germany. The eight manufactories of the I-erlorn consumed in twelve months 600 tons of wire, employing 800 male and 700 female operatives, besides seven steam engines and four water wheels of 230 horse power.