Electric AND Magnetic

Latest Morse Development.

A new system of telegraphy has been invented by Stephen D. Field, the well-known telegraph engineer. The new system is a modification of the Morse, and is, the inventor believes, the final step in its development. In the Morse system of transmission, the relays at each station are operated directly by the current from a battery which flows through the line when the key is closed. The strength of the current at each relay, and hence the sharpness of the signals, depends, of course, upon the voltage employed and the electrical constants of the line. But they also depend upon the goodness of the line insulation, and in bad weather so much leakage may take place that it will be impossible to obtain sharp signals: the relays respond slowly and transmission is tedious and difficult. Mr. Field's new system is designed to overcome this trouble and render the line independent of the weather, and other factors having a similar influence. It has given beautiful results on an artificial line purposely made as bad as possible.

In the new system of Morse transmission, advantage is taken of the idle time occupied by the spaces in the alphabet to store up, at each station where the transmission key is being manipulated, a small amount of energy from the line battery and relay discharge currents, said energy being utilised in the formation of the next succeeding dot or dash. The result is accomplished by means of an induction coil and condenser arranged to bridge the signal key.

When a key is open, a condenser is charged through a heavy impedance which is formed by the primary of an induction coil, the secondary of which is included in the line circuit. On closure of the key, the energy stored in the condenser acts inductively upon the primary winding, setting up currents in a direction to assist the line battery in its work. As a result of this arrangement, all the relays in the circuit respond firmly and quickly to the key movements, no matter how "high" their adjustment, and it becomes possible to work circuits at full speed during stormy weather, which, under old conditions, could only be operated very slowly or not at all.

Development in the Electrical Manufacture of Steel.

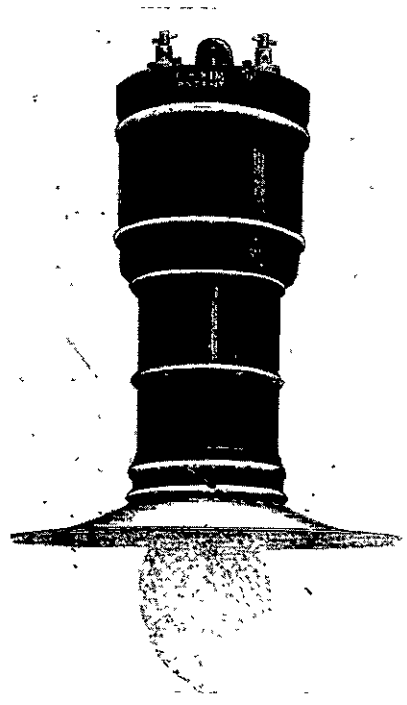
It is reported form Prague that Austrian papers are discussing the introduction of the Kjellin process in the manufacture of steel by the Poldihütte, at Kladno, Bohemia, in concert with the Oberschlesische Eisenindustrie-Gesellschaft, which process, says the Prague *Tagblatt* may bring about a complete revolution in the Austrian steel industry. Continuing, the Prague *Tagblat* says :—

"That such steps may be leading to vastly important results may easily be realised, when it is considered that the Kjellin process yields an excellent steel, said to be fully equal to the best crucible steel, while the cost of production is considerably lower than with the mode of production so far in use. The Kjellin product, however, apart from its lower cost, is further praised for its ductility, density, homogeneousness, softness, the possibility of obtaining high degrees of carboniferous quality, and, finally, for its excellent magnetic properties. If these surmises—as appears highly probable—should be proved by facts, all undertakings which have at their disposition the primary requisite for the adaptation of the electric process, viz,, cheap electric power by means of sufficiently strong water power, will secure a great advantage over other works. Chief Engineer V. Engelhardt, in his work on the Kjellin process, states that it can compete with the Siemens-Martin, where the kilowatt hour can be put down at about a farthing.

(This fits N.Z. like a glove.)

Arc Lamps for Railways.

Since the Maxim arc lamp installation of the Metropolitan District Railway, it is interesting to note that all the electric tube railways have adopted the Maxim arc lamp for station lighting, and that the L. and S. W. Railway



THE MAXIM ARC LAMP

and other railways have also adopted this same type of semi-enclosed arc lamp. The lamps are usually run four or five in series upon power circuits: and each lamp is self-contained and interchangeable. The Maxim Company have introduced a substitutional resistance and cutout, which are perfectly satisfactory in working, and sufficient to absorb the extra voltage, should one or more of the lamps in a circuit fail from any cause.

The illustration herewith is of the type of lamp used on London's latest "Tube," the Great Northern, Piccadilly, and Brompton Railway, the style of case of which is quite new, and as will be seen is certainly very pleasing.

The case is of steel, coated inside and out with a hard vitreous enamel; the lamp is extremely durable, and is ventilated, but weather-proof.

Magnetic Survey of N.Z.

The government has been asked to complete the survey of Greater New Zealand, and the Committee proposes to increase its sphere of usefulness by the formation of a scientific staff to thoroughly examine the natural products of the islands, geologically, zoologically and botanically; such a survey would be of the greatest interest, and, as the gathering together of the necessary equipment would take some time, it is understood that the committee is anxiously awaiting authority to undertake the project.

It is extremely gratifying to notice that the work already done by the Magnetic Survey Committee in New Zealand has been the subject of most favourable comment of authorities in other countries, and it is to be hoped that the government will not stand in the way of the rapid completion of a work of such high scientific import.

It is probable also that at no other time could the project be undertaken at such little cost, as the whole of the staff, including the gentlemen selected to carry out the Natural History Survey, are prepared to give not only their scientific experience, but their time also, in furthering the objects of the Committee.

Wireless Music.

Seeing that telephoning without wires has been accomplished, it is not very surprising to be told that an English naval officer has succeeded in transmitting music over distances without using any metallic conductor. Mr. C. W. James, writing in the *Tribune*, describes a visit he paid to the inventor's ship to test his invention. He placed receivers to his ears in one of the cabins, and amid the din of repairing hammers all round him, listened to "God save the King," sung in another part of the ship. Every note was distinct and the modulations of the voice were easily discernible. The tone was rasping, but the inventor was confident that it would be improved. The visitor was then bidden to listen to a signaller singing in a ship half a mile away. The first song was considerably interrupted by ordinary messages, but the listener could make out fragments of a tune which he recognised as the popular "Out on the Deep." "Pop goes the Weasel" was heard with wonderful clearness, and the "Soldiers' Chorus" from "Faust" was loud and distinct in its inflexions. Finally, the "Bay of Biscay" was sung amid perfect conditions, and was heard from beginning to end. Mr. James does not pretend that the music heard in this way is delightful, but he says he sat at an hotel and listened to an opera through an electrophone without feeling much greater pleasure than that which wireless singing gave him. As for the practical importance of the new discovery, it is said to be proved than an intoned wireless message is heard more clearly than a spoken one, and the inventor has found a way of restricting the area of operation of any signal. It can be arranged so that sounds can be heard at certain distances and not at others, so that signals can be sent round a fleet and yet be in no danger of falling into the possession of ships of the enemy hovering about. If a commander chooses, he can deceive the enemy by sending forth two sets of musical signals, pitched in different keys, one for the enemy and one for his own ships. Important improvements in the system may also be looked for. Hardly a month elapsed between the hearing the first note of wireless music by the inventor and the successful wafting over the waters of "The Bay of Biscay," so that the invention is as yet in its infancy.