

LONDON'S GASOLINE-PROPELLED CABS.

BY THE ENGLISH CORRESPONDENT OF THE SCIENTIFIC AMERICAN.

A new type of cab propelled by a gasoline motor is being introduced into London to take the place of the hansom cabs so much in vogue in the English metropolis. This new type of vehicle, as may be seen from the accompanying engraving, comprises the cab with accommodation for two passengers, and a seat in front for the driver. The cab itself is similar in design to the hansom at present in use, only it is much larger and more roomy. It is provided with a glass front fitted with a spring attachment, which permits its being raised or lowered instantly as desired.

The driver's seat is only half the width of the chassis, sufficiently large to seat the driver only, so that the passengers within the cab can obtain practically an uninterrupted front view. The cab is slung upon four wheels, which renders it far safer and more immune from the dangerous accidents to which the two-wheeler is so subject. The chassis is of Paris manufacture, with a twin cylinder Aster engine developing 12 horse power placed in the front of the vehicle beneath a bonnet in the usual manner. Three speeds and reverse are provided, the maximum speed being 25 miles per hour. The two lesser speeds are comparatively low, especially the first speed, so as to enable the vehicle to readily climb hills. The second speed has been designed so that the car can be easily handled in congested traffic without any possibility of the engine's racing. The drive is transferred from the gear box to the rear live axle through a universal coupling. Change of speed is effected by means of a side lever, and steering by wheel. The gasoline tank is placed beneath the driver's seat; its capacity is seven gallons. Jump spark ignition by means of accumulators is employed. To prevent side slipping as far as possible, which is very frequent upon the London streets, especially in wet weather, owing to asphalt and wood entering so extensively in the paving, the cab has been provided with a long wheel base, and the weight has been reduced to a minimum

by the employment of aluminium. The wheels are equalized, of the artillery type, and shod with pneumatic tires.

These cabs are to ply for hire in the same manner as the present horse-drawn hansoms. The same fare of two miles for 25 cents in American money will be charged. Seventy-five of these cabs are to be in-

York for a journey of like length. Why it is not possible to provide a system of cheap transportation somewhat similar to that of London is a question with which few Americans seem to concern themselves.



ONE OF THE NEW GASOLINE CABS OF THE CITY OF LONDON.

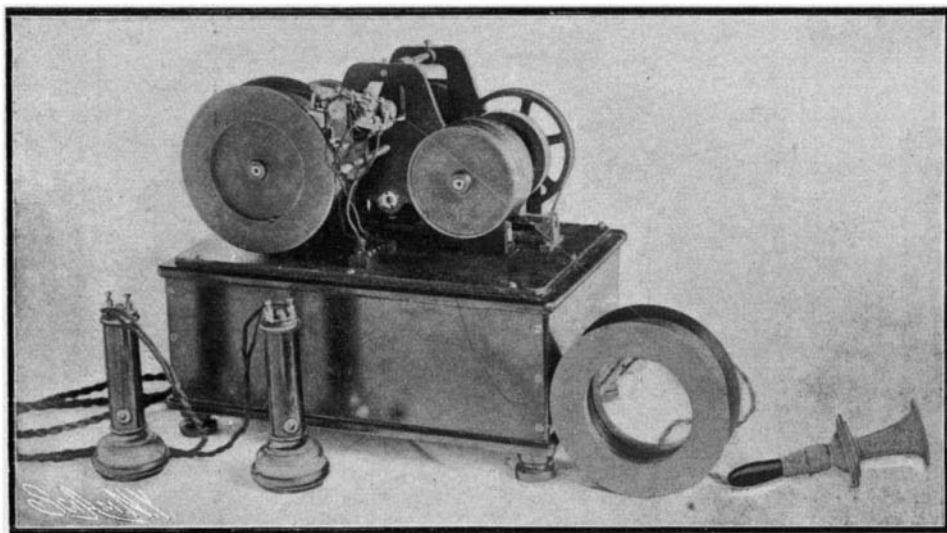
stalled immediately. Ordinary hansom-cab drivers are being taught the management of the vehicles, in preference to employing automobile chauffeurs. The new cabs will not only be safer than the existing hansoms, but will be more speedy and comfortable, and the cost of upkeep, even after allowing for depreciation, will not be so expensive as the horse vehicles.

Compared with these light and rather graceful London cabs, the hansoms that thread the streets of New York in particular, and most large American cities in general, seem decidedly at a disadvantage. New York's public electric vehicles are certainly clumsier in appearance. In cost, too, Americans have to suffer. An Englishman can travel about comfortably for about one-third the money that would be exacted in New

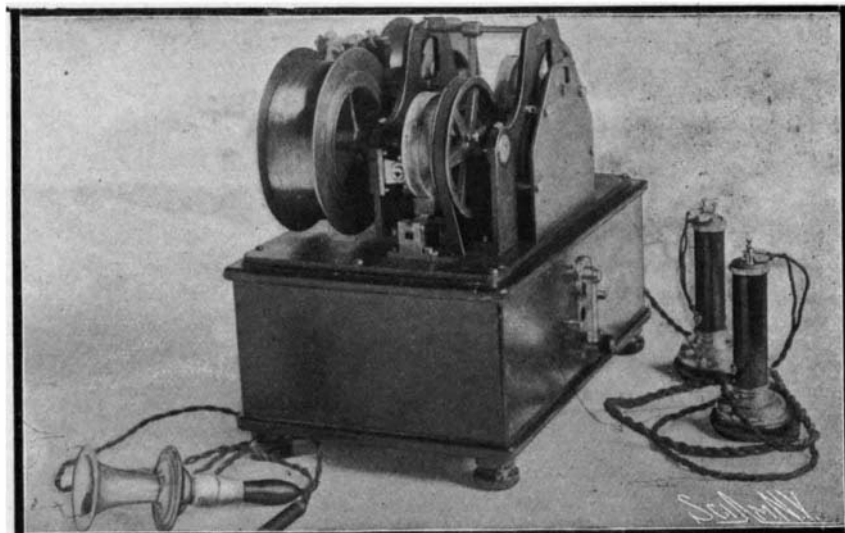
THE NEW TELEGRAPHONE.

The Poulsen telegraphone has been so fully described in these columns that the only excuse for still another account of the instrument is to be found in the marked improvements which have been made. New instruments have been brought to this country which are considerably more compact and more efficient than the old. The principle of the invention, however, remains unchanged. It will be remembered that current from the secondary coil of an ordinary microphone and induction coil system is sent through a small electro-magnet, past which a steel surface is moved. Each molecule of the steel surface is magnetized to a degree corresponding with the current variations set up by the voice in the speaking circuit. In order to reproduce the sounds of the voice thus magnetically recorded, it is necessary simply to connect the coil with an ordinary telephone receiver, and to pass the magnetized steel surface again under the magnet. In one of the forms previously described in these columns, the steel surface was a wire, spirally

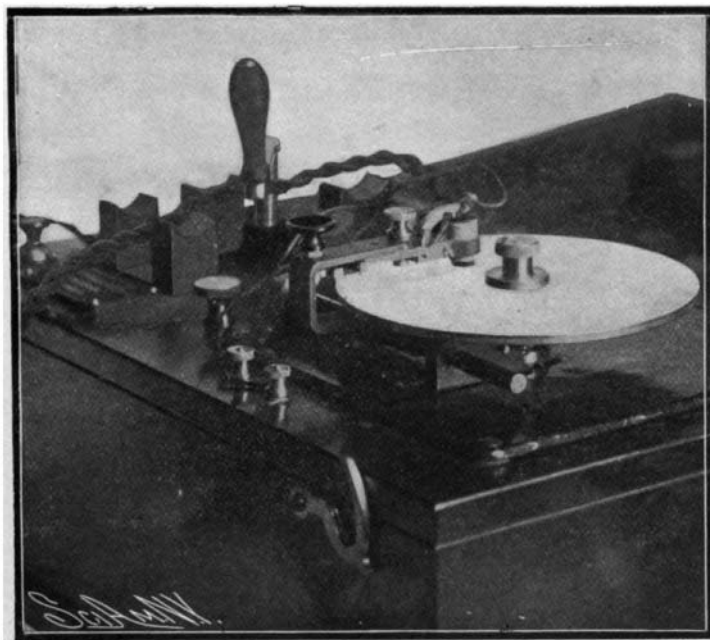
wound about a drum, rotated at a constant speed, mechanically or by hand. In its general appearance, the instrument was not unlike the Edison phonograph; it had a carriage which moved forward at a constant speed as the cylinder with its wire turned beneath it. Impelled probably by the desire to produce an instrument resembling the disk type of phonograph, Poulsen has designed an instrument in which a steel plate is used instead of a wire spirally-wound about a cylinder. In its manner of operation this new instrument resembles the ordinary gramophone. The disk is rotated by clockwork in the same way. The records are not produced with the full loudness of the ordinary gramophone; still, they are entirely distinct and are singularly free from the scratching



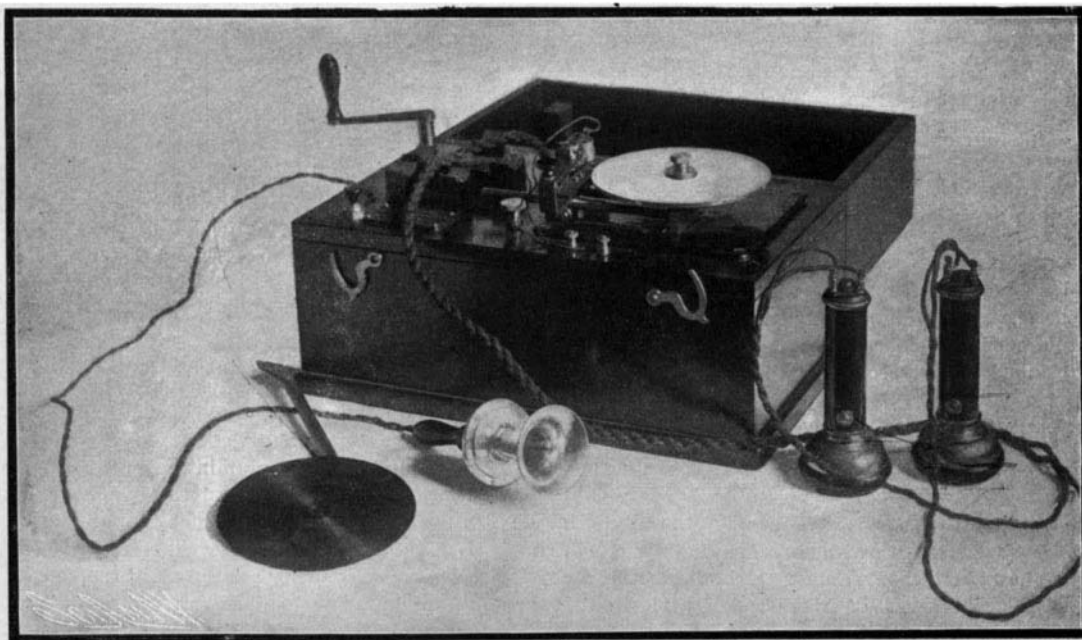
Wire Type of Telegraphone with One of the Reels Removed.



End View of the Wire Telegraphone.



Details of the Disk Type of Telegraphone.



The Poulsen Telegraphone.—Disk Type.

THE IMPROVED TELEGRAPHONE.

and hissing occasioned by the stylus as it passes over the wax surface. The steel disk which receives the message is about 5 inches in diameter, and is secured to a rotating plate by a milled nut. As the disk rotates, the magnet and coil, which are held in a carrier, are gradually moved toward the center of the disk by a micrometer screw. The speed of rotation is increased as the magnet approaches the center of the disk, so that the disk rotates beneath the magnet with a constant linear velocity of one-half a meter per second. The record is easily erased by passing a bar magnet over the disk. In place of a pair of magnets with two coils, which characterize the earlier machines, a straight magnet is now employed. This magnet is a pointed needle which can be lifted out and renewed, the coil being imbedded in an insulating composition and held in a small ebonite cylinder.

Still another new form has been designed in which a steel piano wire is employed, wound off one wheel to another between two magnet poles by an electric motor contained in the base of the instrument. The speed is about 10.64 feet per second. Enough wire is carried on the reels to make a record three-quarters of an hour in length. Should only a part of the record be used at a time, its position can be noted by an indicator finger which rotates at a speed equal to that of the reels. In this machine three pairs of magnets and coils are used, each pair consisting of two magnets and coils similar to the straight magnets previously described. The magnets are placed horizontally, one on either side of the wire. The sounds are recorded by the middle pair of magnets, the pairs on either side serving for demagnetization or erasure. As the wire winds off, the magnet carrier travels back and forth, serving both to hold and guide the wire on and off.

By a reversing switch the motor can be reversed at one side, and one of the pairs of erasing magnets energized. If the wire is passing from right to left, the right-hand pair of magnets receives the current; any previous record that may be on the wire is completely erased. A new record can then be made, which can be heard by removing the microphone and using in its stead telephone receivers. The wire can be run back to any point, so that the instrument can repeat any part of the record. The second pair of magnets serve the purpose of enabling the wire to record a message while it is being run off from the right to the left, or from left to right, and the erasing magnets on the right or left are connected up (when the microphone and not the receivers are in use) according to the position of the reversing switch for the motor. It is a rather remarkable circumstance that, although the coils of wire are packed closely together on the reels, no demagnetizing effect is to be observed, nor is the record in any way impaired. In clearness of reproduction this wire instrument leaves nothing to be desired. The articulation could not be improved.

Death of Prof. Alexander Bain.

Prof. Alexander Bain, Lord Rector of Aberdeen University, died on September 17. He was born in 1818. At the age of eighteen he entered Marischal College, and received his degree of Master of Arts in 1840. After teaching for five years he was made Professor of Natural Philosophy in Andersonian University, Glasgow. Later he was connected with the Metropolitan Sanitary Commission and the General Board of Health and as Examiner in Logic and Moral Philosophy at the University of London. After having been appointed Crown Professor of Logic at the University of Aberdeen, he was elected Lord Rector of the University. Prof. Bain is known to scientific men chiefly for his works on natural philosophy. Among his best known books may be mentioned "The Senses and the Intellect," "The Emotions and the Will," "The Study of Character," "Logic, Deductive and Inductive," "Mind and Body: Theories of Their Relation." To students of English literature he is best known for his "Manual of English Composition and Rhetoric" and his "Rhetoric." John Stuart Mill wrote of him: "Bain has stepped beyond all his predecessors and has produced an exposition of the mind of the school of Locke and Hartley which deserves to take rank as the foremost of its class, and as marking the most advanced point which the *a posteriori* psychology has reached. . . . With analytic powers comparable to those of his most distinguished predecessors, he combines a range of appropriate knowledge still wider than theirs; having made a more accurate study than perhaps any previous psychologist of the whole round of physical science."

Statistics recently published by the Bulletin de l'Office du Travail of the strikes in France during 1902 show that more than half had for their object to obtain increases of wages; 111 times out of a total of 512 strikes this object was attained, 184 times there were compromises, and 213 times the strikers were unsuccessful.

Electrical Notes.

Austria's first standard electric railway was recently opened. The line extends between Tabor and Bechin, in Bohemia, and has a length of 15 miles. The maximum speed attained is only 19 miles an hour. That passenger traffic is strictly limited in this district of Bohemia may be essayed from the statement that a train consists of only two cars, with a carrying capacity for 40 passengers and 36 tons of goods. The new railway has a special interest from the fact that we believe it to be the first line to be entirely regulated by the telephone. There are no signals, the telephone being used by the driver in all cases to ascertain whether the line is clear. Each car is fitted with a portable instrument, which may also be used by the passengers.

A company is being promoted with the object of generating electricity by means of water power from the lakes on Snowdon and in the neighborhood of Conway. The current will be supplied to a short railway and to certain towns in the district of Snowdon, to local quarry owners, and in bulk to more distant consumers. It is the intention of the company to tap Lake Llydaw, which lies on the eastern slope of Snowdon, at an elevation of 1,416 feet above sea level. This lake is just over a mile long, and averages about one-sixth of a mile wide. This is equal to an area of about 5,500,000 square feet. It collects the rainfall from an area of about 47,000,000 square feet, and the average rainfall on this area is estimated at about 170 inches per annum. It is proposed to build a dam 150 feet long across a portion of the lake, and thereby raise the water 20 feet. The lake can be tapped 30 feet below its present level, or 50 feet below the proposed level, which is estimated to be equivalent to a storage of at least 250,000,000 cubic feet. The site for the generating stations will be at a point 11,200 feet below the lake, with which it will be connected by steel pipes. With this head the impounded water is estimated to be sufficient to provide 6,100 horse power for 90 working days, independent of any rainfall and permanent streams during that time.—Mechanical Engineer.

A process of producing carbon with a shining surface introduced by Siemens & Halske is described in the *Elektrotechnische Rundschau*. The process consists in introducing the positive pole into an electrolyte (acidulated water), and in exposing it to a tension of from 100 to 200 volts for a short time, when any carbon particles surmounting in the least the surface will be projected or oxidized, the surface assuming, instead of its unpolished aspect, a very high polish. This effect is due to the chemical action of the oxygen disengaged by electrolysis, and to the simultaneous influence of the high temperature produced by the process. The best course is to suspend in a vessel containing a suitable electrolyte—e. g., some sulphuric acid diluted in the ratio of 1 to 10—the negative pole of a source of current. The surface of this electrode may be chosen very small. After the carbon to be treated has been joined up to the positive pole of the current source and introduced into the electrolyte, the negative pole will, in spite of its small surface, remain dark, whereas a strong evolution of oxygen, in connection with luminous phenomena, is observed at the positive pole. If the carbon be taken out of the electrolyte after a few seconds, it is found to have taken a high polish. Tensions between 100 and 200 volts are the most suitable, the process being furthered by heating the electrolyte to a temperature near its boiling point.

In the *Phys. Zeitschr.*, E. Grimsehl describes a novel sensitive aluminium leaf electrometer of his own design. The rectangular case is made of brass of dimensions 5 x 7 x 16 centimeters, and supported on three leveling screws. The back and front of the electrometer are furnished with glass plates sliding in grooves on the framework. Through an insulated ebonite stopper passes a vertical brass support for the three aluminium sheets. A piece of aluminium-foil, 90 x 3 millimeters, acts as the needle, and is supported between two thin sheets of aluminium 90 x 6 millimeters, of which one is fixed vertically and divides the charge with the needle, while the other turns on an insulated hinge from the same support and is earth-connected. This movable sheet of aluminium may be adjusted from the outside of the case until it is near the fixed sheet, and thereby increases the sensitiveness of the instrument. A graduated mica scale, reading from 0 deg. to 30 deg., serves to indicate the quantitative measurements, and the author claims that the instrument will show a difference of 2 volts when the movable and fixed aluminium are 4 deg. apart. When the distance is increased to 30 deg., each degree represents 10 volts. When not in use the needle is held lightly pressed between the two outer aluminium sheets. A condenser is fitted to the top of the electrometer in order to demonstrate the fundamental ideas of contact electricity. The instrument would be useful for experimenting with Becquerel rays or with ultra-violet light.

Engineering Notes.

During the month of July, 3,307 vessels, measuring 454,573 register tons net, used the North Sea and Baltic Canal, against 3,217 ships and 413,466 tons in the same month of 1902. The dues collected amounted to 211,501 marks, against 192,719 marks.

There are immense forests of Aleppo pines in Algeria, which have up to now been considered of little value; the suitability of this wood for road paving, and for timbers for mines and telegraph posts, may have the effect of enhancing the value of these forests.

The *Revue Generale des Chemins de Fer* reports that in a series of experiments made at the shops of the Paris, Lyons & Mediterranean Railway on the radiating qualities of different methods of jacketing boilers, it was found that bare jacketing radiated less than the painted, the difference being from 55 to 185 heat units per square foot of surface per hour. In calm air and under the same conditions a single jacket of mineral wool radiated about one-half as much heat as a bare jacket, and one-third as much as a painted one. Where a double layer of mineral wool was used, the losses per square foot were about one-half as much as they were in the case of a single layer. With a double jacket and a layer of mineral wool between the losses were about one-half as much as they were with a single jacket without the wool. It was found that in air currents when the velocity was greatly increased the losses were doubled, and that a layer of mineral wool reduced these losses about one-half. The effect of painting is to increase the loss, but not to so great an extent as in calm air.

The increasing use of emery wheels in the engineering industry has naturally directed attention to the necessity of protecting the workman in the event of the bursting of these artificial grinding wheels. With a view to obtaining a device that will protect the workman against the flying fragments when a burst occurs, the Association des Industriels de France is offering a prize of 1,000 francs for the best design of emery wheel guard. The competition is an international one, and any design submitted is expected to meet the following requirements: (1) To be intended for a wheel mounted between two bearings; (2) to prevent the flying of fragments in the shop; (3) not to impede the execution of the work on whatever part of the wheel it be desired to perform this work; (4) to retain its effectiveness though the wheel be worn away; (5) to be adapted easily to the different types of wheel frames; (6) to be sufficiently cheap for a ready adoption. Competitors should deliver to the president of the association, 3 Rue de Lutèce, Paris, before December 1, 1903, a complete description of the device they offer, with drawings. Any further information respecting the competition can be obtained on application to the secretary of the association at the address mentioned.

Berlin has entered definitely upon the employment of electrical traction for suburban service on the State railways of standard gage. Since the middle of May experiments have been in progress on the line from the Potsdamer railway station in Berlin—the focal point of suburban traffic within the city limits—to Gross Lichtenfelde, a distance of 5½ miles. These experiments having proven entirely successful, regular traffic was begun on July 15 with trains of three cars each, which depart in each direction every ten minutes and are permitted by ordinance to make a speed of 60 kilometers (37.2 miles) per hour. The current is supplied from the southwestern power station of the already existing circular railway (Ringbahn) and is transmitted over an insulated third rail laid beside the track, whence it is taken up by a contact shoe connected with the motor. Each train is made up of one second and two third class cars, each 63 feet long by 9 feet wide and which weigh—all three together—128 tons and seat 200 passengers. The second-class car is at the middle of the train and carries no motor. Each third-class car carries a motor at one end and these, being put at the front and rear of each train, enable it to run forward or backward as desired. The cars are new and as handsomely finished as their purpose would justify. They are equipped with heating apparatus for winter and would be considered comfortable and up-to-date even in the United States. The opening of this line is noteworthy because it marks the beginning of a general change from steam to electricity for the important and rapidly growing suburban service of Berlin. So comfortable, rapid, and convenient have the electric street railway connections become—especially the overhead and subterranean line which was opened in February, 1902—that aside from all considerations of economy the steam lines are constrained to go over to the new, clean, convenient, and more economical system of traction in order to hold their traffic and secure their business for the future. A second line, which leads to Cöpenick—several miles distant up the Spree—is in process of conversion to electricity, and will inaugurate the new method of traction during the summer.