

A New Incandescent Lamp.

A new incandescent lamp with a zirconium filament is announced in Germany. Prof. Wedding, the well-known physicist, recently presented a lamp of this kind to the Electro-technical Society of Cologne. The details of the process are as follows: To obtain the filament he submits oxides of zirconium and magnesium at a high temperature to the action of hydrogen, which gives an alloy of a more or less constant composition. This body is then pulverized, and by adding a cellulose solution it is transformed into a plastic and homogeneous mass. It is from this mass that the filaments are drawn. The latter are carbonized in an atmosphere which is free from all traces of oxygen, and then present a metallic appearance. It is said that one pound of zirconium will furnish 50,000 filaments. The new lamp is to be placed on the market at the price of \$0.37. Under regular working, the zirconium filament consumes a current of 2 watts per candle-power, which is less than for the usual carbon filament. The zirconium lamps are made at present to run with a current of 37 volts, and three of them can be conveniently placed in series across the usual 110-volt circuit. Another type uses 44 volts, and five lamps are connected upon a 220-volt circuit. To obtain a high candle-power lamp they place several filaments in the same bulb and the lamp is then connected directly upon a 110-volt circuit. Experiments which have been made with the lamp show that it has a life of 700 to 1,000 hours.

ELECTRIC MAIL AUTOMOBILES.

The post office department of Paris is now using several electric mail wagons which are designed to transport the mail matter in larger quantities and at a greater speed. These now run within the city limits, and distribute the mail between the main post office and the different branch offices which lie throughout the city. Our engraving shows one of these new automobiles, which have been specially built for the purpose by Mildé & Co., one of the leading electrical houses of the city. The new car has the advantage of running at a considerably higher speed and at the same time carries a larger quantity of mail matter—nearly half as much again as the horse vans which were formerly used exclusively for this purpose. These latter are still in use, but it is expected that they will be eventually replaced by the electric van. The latter contains about 45 cubic feet of available space in the interior for the mail matter. The automobile chassis which has been designed for the purpose carries the electric motor, which is built in compact form and entirely inclosed, in the center of the car. The differential device is contained in the same case with the motor. Chain driving is employed from a sprocket on each end of the differential shaft to a large sprocket mounted on each wheel. On the chassis is mounted a box body of considerable size which contains the accumulator cases in the lower part and above this the remainder of the space is used for the mail matter. Access is given to both compartments by a double door in the rear. The accumulator cells are contained in a single box, which can be easily slid out and replaced by a new one.

The driver's seat, along with the steering wheel and the controller for the motor circuits, is placed high in the front.

It was decided to construct fifteen electric automobiles of the above pattern and put them in regular operation within the city limits in order to give them a good trial and especially to compare them with the horse vans, both as regards economy and speed of running. The new automobiles commenced the regular service about the first of November last, under the direction of M. Dubois, who is the chief of the mail transportation department. Since then the cars have been running very successfully, and all are in accord that they are a great improvement over the old system. Some 15 miles an hour is adopted as the highest

speed which can be safely used within the city, but the motors can drive the cars at least as high as 25 miles an hour. Owing to the increased speed over the former system, the mail can be collected from the different post offices at a later hour and in like manner the mail can be distributed sooner, so that the schedule of collecting and closing the mails can be changed some thirty minutes in either direction, and this is a great point in favor of the new system. The increased capacity is another advantage which is appreciated by the post office department. A charging station for the accumulators used on the cars has been installed in the main post office building. The sets of batteries are double, so that while one case of cells is being used on a car, the second is being charged at the sta-



ONE OF THE ELECTRIC AUTOMOBILE MAIL WAGONS IN USE IN PARIS.



ELECTRIC TRUCK WITH MOTORS IN WHEELS TRANSPORTING UNITED STATES MAIL.

tion. When the car arrives with an exhausted battery, the latter is at once replaced by a fresh one, without any loss of time. The batteries last for half-a-day's run, and the cars come in for charging twice a day, about noon and at night. The weight of the new cars is given as follows: The automobile proper, including the chassis, body, and mechanism, represents 2,220 pounds, while the accumulators weigh 1,320 pounds. The load of mail matter is 1,430 pounds, and two attendants 310 pounds, which makes somewhat over 2½ tons in all.

Automobiles for the transportation of mail matter are being experimented with by several of the leading governments, and gasoline mail cars are now in use in Berlin, Vienna, and in some of the rural districts

of England. On the Isle of Man letters can be posted on a bus that travels across the island and carries the mails. The French government is the first to make use of electric automobiles for this purpose, despite the fact that machines of this type are now used so extensively for commercial purposes in this country, where they were first adopted for such service and where they are rapidly being perfected for it. That our own government does not take steps to improve its mail transportation facilities shows how unprogressive it is. Recently a large publishing house in New York, which has a government mail clerk constantly on duty for weighing and dispatching its mails, tried the experiment of making use of a novel electric truck driven by all four wheels, a picture of which is seen on this page. This truck carried a four-ton load of mail bags a distance of two and one-half miles and returned empty—thus covering a distance of five miles—in 58 minutes running time. It cut in half the time taken by horse-drawn vehicles, while the cost for current at six cents per kilowatt was about one cent per ton-mile of load carried. The truck itself weighed about four tons, hence including this weight, eight tons were moved at a cost for electricity of only half of one cent per ton-mile. This compares favorably with a gasoline truck, while there is not nearly so much wear and tear on the mechanism, or so many parts to get out of order.

The novel feature of the electric truck illustrated is not so much the motors in the wheels as the manner in which they drive the latter. The armature shaft is placed horizontally within the wheel, parallel to its plane; and a bevel pinion on each end of the motor shaft meshes with a bevel gear ring attached to the wheel. There are two rings facing each other; one pinion meshes with one of these rings, while the other meshes with the opposite ring. The thrust of one pinion against its ring is balanced by that of the other pinion against its ring. As these two forces are equal and opposite, they form a couple, the result of which is

to relieve the armature bearings of nearly all pressure and thus reduce friction to a minimum. So great is this reduction of friction, because of the forces that produce rotation of the wheel acting equally on opposite sides of the bearings, that careful tests have shown an efficiency of transmission of 99 per cent up to 16 per cent overload. When it is remembered that the efficiency of a well-cut spur gear is only 85 to 90 per cent, and that in most modern electric trucks a double reduction is employed, it can readily be seen that there is a saving of about 25 per cent in transmission losses alone by employing the "couple gear" with single speed reduction. That the total efficiency of the vehicle is increased, also, by using four separate motors instead of two seems to be demonstrated by a 30 per cent decrease in current consumption when compared with an ordinary truck of like size.

The life of the battery and motors is greatly lengthened, also because they are never overloaded to any serious extent. The Exide battery on the present truck has been cleaned but once in the fifteen months the vehicle has been in service, and during which time it has

covered something like four thousand miles.

So successful has been the manufacture of military rifles at the factory established in Quebec by Sir Charles Ross, that it is now proposed that Canada shall make her own cannon. The purpose in establishing the rifle factory in Quebec was to make the Dominion independent of English manufacturers, who, in the event of the interruption of communication, might be unable to supply rifles for the Canadian troops as rapidly as desired. The results have been entirely satisfactory. Now that the Canadian artillery is to be enlarged and re-armed with a more modern gun, it is held by military experts that the new ordnance should be made in the Dominion.