

leaves the motor by the exhaust pipe, Y. When the piston redescends, this valve closes and the upper valve opens, as before, to admit a fresh supply of gas and so on.

The action of the motor is thus determined by four different periods, which may be characterized as (1) introduction of gas, (2) compression, (3) explosion, (4) evacuation of the products of combustion.

Figs. 2 and 3 show the tricycle complete. In Fig. 2 the handle, D, serves to open or close at the proper time the cock shown in the diagram, Fig. 1, at Z, which permits the piston to ascend and descend freely when starting the motor. The handle, A, displaces the support of the contact of the induction coil in order to vary the instant of ignition with relation to the introduction of gas; the handles, B and C, serve respectively to regulate the admission of gas to the motor and the introduction of air into the carbureter. The pedal, P, operates the main axle of the tricycle and at the same time starts the motor, which is geared to the same axle. The tricycle may be operated by the pedal alone in case of accident or in mounting steep grades.

Figs. 4 and 5 show the motor dismounted and provided with a frame for securing it to the tricycle. A is the admission valve; B, igniter; C, exhaust pipe; D, rod and spring of exhaust valve; E, contact, cam, and binding-posts.

The maximum speed of the tricycle is 40 kilometers (24 miles) per hour, and grades of eight to ten per cent may be mounted without the aid of the pedals.

The Waltham Manufacturing Co., of Waltham, Mass., will exclusively sell the product of De Dion-Bouton & Co. in the United States, and in addition to selling the regular machines now manufactured by De Dion-Bouton & Co. they will import the De Dion motors and make a complete line of "Orient motor cycles and motor carriages." They are now building tricycles, trailers and attachments, tandems, and a light carriage, and will add other vehicles.

Paris. E. BERNARD.

#### A COMBINATION PLEASURE AUTOMOBILE DELIVERY VEHICLE.

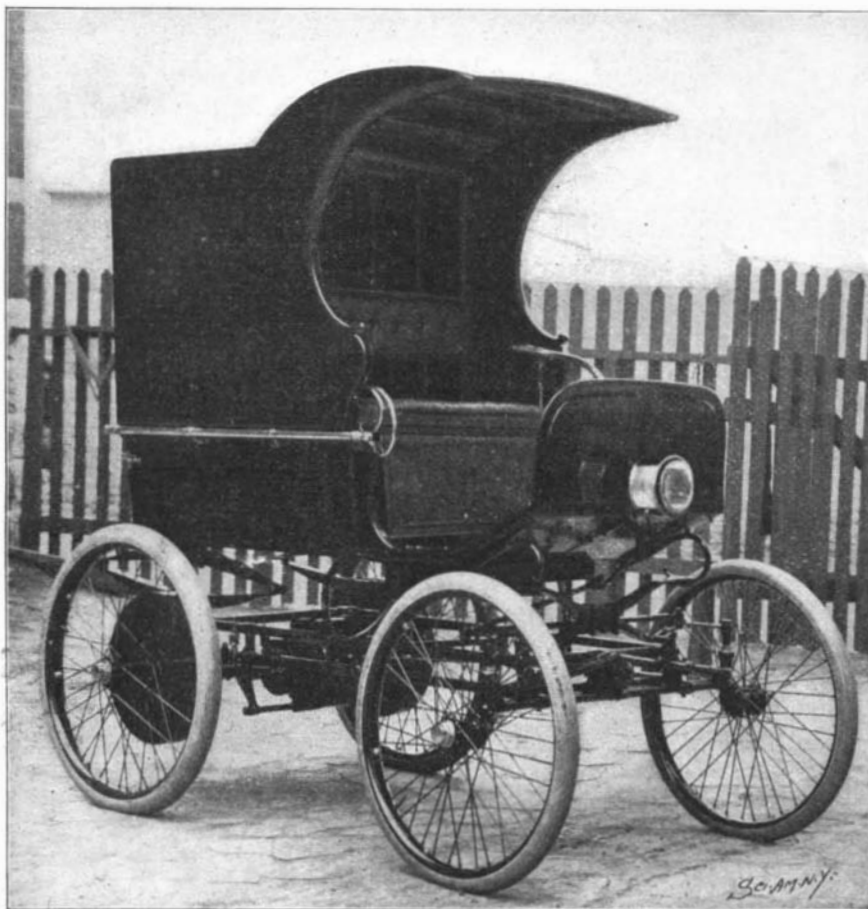
Our engravings represent a unique form of vehicle which is made by the Indiana Bicycle Company, of Indianapolis, Ind., manufacturers of the "Waverley" bicycles. The peculiarity of this carriage is that the delivery body is separate from the body proper, so that it can be used for the delivery of parcels or as a pleasure vehicle. This style of vehicle is intended for the use of merchants when they desire to have a delivery wagon for use on week days and a pleasure vehicle on Sundays, and the change from business wagon to carriage is quickly made.

The carriage weighs 3,310 pounds and is operated by electricity, furnished by forty-two 80-accumulator cells. There is a specially designed multipolar motor of two and a half horse power which drives the vehicle. The shaft is geared directly to the rear wheel, propelling the vehicle by a single reduction. Each rear wheel revolves independently of the other through compensating gears which are placed in line with the motor shaft. It has five speeds, varying from three to twelve miles per hour, and the radius of action is, under favorable conditions, about forty miles; but on its trial trip, with the batteries as taken from the forming room, and not having a regular charge, the wagon made 54.6 miles, coming in strong at the end of the trip. The load was only two men. During this run

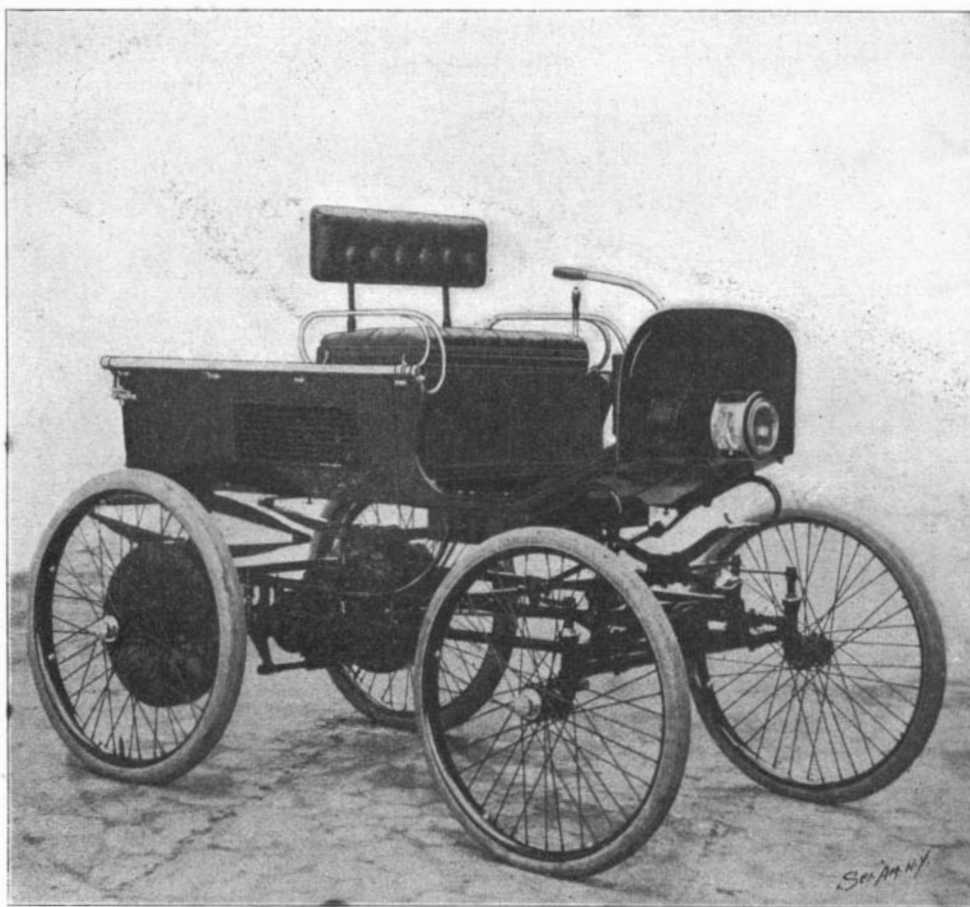
it went through unimproved streets, over grades, some of which amounted to 7 per cent, and was put through as severe a trial as possible in a city like Indianapolis. The greater part of the run was made, however, on well paved streets, as it is likely that a vehicle of this kind would generally be used where the streets and roads are fairly good. The running gear is of tubular construction, and the wire wheels have ball bearings throughout and are fitted with Royal single tube pneumatic tires. The delivery body is separate from the body proper and is furnished with angle irons along the lower edges which engage slotted tubes attached to the body by brackets, and sufficiently raised

to prevent contact, thereby protecting the finish. The slotted tubes are raised by their brackets sufficiently to carry the delivery box about  $\frac{5}{8}$  of an inch above the body proper. The wagon which we illustrate is now running about forty miles a day in Indianapolis and is considered to be a very successful vehicle. The same company are making a number of other styles of automobile carriages and vehicles, but the one we illustrate is of particular interest owing to its convertibility.

Value of Trade Marks in the Philippines. According to a Consular Report which has just been



INDIANA BICYCLE COMPANY'S CONVERTIBLE MOTOR DELIVERY WAGON



THE SAME VEHICLE, WITH THE TOP REMOVED, CONVERTED INTO A PLEASURE CARRIAGE.

issued, trade marks are worth a great deal in the Philippines. One representative firm of importers writes as follows:

"Well-known marks are worth a great deal in this country. Take, for instance, our mark 'cock in cage,' for white drill. The same quality, the same size, or even wider, imported by other houses is paid for at the rate of \$8.50 a piece, which leaves a modest margin. We sell our brand at \$10, and dispose of 50 to 60 cases a month in Manila and 20 cases in Iloilo."

In view of facts like these, American firms who are thinking of trading in the Philippines should obtain protection of a duly registered trade mark,

#### Wrappings for Bicycles.

Notwithstanding the rapid improvements which have been made in the construction of bicycles, the method of packing and covering them for wholesale delivery is still in a primitive condition. It is one of those details, apparently trivial, which get overlooked, says The Cycle Age and Trade Review, and the ancient method of swathing frames and wheels in yards and yards of intricate paper or fabric bandages is yet with us. The system teems with disadvantages and difficulties, the number of packers required, the space necessary for wrapping at the factory and unwrapping at the sellers' stores, and the untidiness of this operation, are all sufficient reasons against perpetuating the present methods.

A Birmingham inventor has recently devised a system of protecting the frame by means of tubes of stiff paper or cardboard slotted longitudinally, so that they may be slipped over the frame tubes and held in position both by their natural contraction and by tapes or other suitable additions. For all ordinary purposes the tubes, such as used for containing photographs, form ample protection for the frame; but the inventor also provides for the lining of these tubes with a soft material for additional protection and for attaching fabrics at the ends of the tubes to wrap over the lugs.

#### Specialism in Bicycle Construction.

The tendency toward specialism, which is a marked feature and one of the most important secrets of our success in the mechanical industries, is seen in a very high state of development in the manufacture of bicycles. In the earlier history of the wheel, when makers were few, and shapes and dimensions were necessarily experimental, it was customary for each firm to build its machines practically from the ground up. The manifest advantages in respect of economy resulting from specializing the work are responsible for the growth of several large establishments which are devoted entirely to the construction of some single part of the wheel. These firms are in the habit of buying up all the patents possible covering their particular form of construction, and an inquiry as to the number of patents thus controlled suggests what a large amount of inventive thought has been bestowed on the bicycle as a whole to bring it to its present perfection. A good case in point is the Fauber crank hanger, the manufacturers of which now control as many as seventy patents on this part of the wheel alone. Of course it will be understood that these patents cover the cranks, sprockets, and hanger combined; but even in this case the total number of patents is extraordinary, and suggestive of the searching scrutiny to which every item of the bicycle is being subjected in the endeavor to bring it to the highest mechanical efficiency.

#### Work at the Rock Island Arsenal.

The War Department is to develop at once the machinery plant at the Rock Island Arsenal to such an extent that it will turn out 2,500 Krag-Jorgensen rifles per day. There is no intention of curtailing the work on small arms now in progress in the Springfield Arsenal. The latter plant will still continue to supply the bulk of arms called for in times of peace, and the Rock Island Arsenal will be developed so as to have a vast reserve power in time of need. The ordnance officers state that the war last summer shows that private establishments

cannot be depended upon to install equipment rapidly enough to meet emergencies. Congress has appropriated \$500,000 for ordnance work. All of this sum is available for the Rock Island Arsenal. There are at present 1,500 men employed in the works, and last July they numbered 3,000.

#### The St. Louis Fair.

The subscriptions from various sources for the St. Louis fair have now amounted to \$2,673,000, in addition to the \$2,100,000 pledged by collecting committees. The amount so far actually raised is now close to the \$5,000,000 originally promised.