THE DE DION-BOUTON TRICYCLE.

Nowhere has the development of automatically propelled vehicles reached a more advanced stage than in France, where, on account of the fine roads and pavements, the most favorable conditions are found for their operation. Carriages and tricycles operated by gasoline motors are now among the ordinary sights in the streets of Paris. Among the latter the tricycle De Dion-Bouton is most extensively in operation, and may be considered as typical of this class of vehicles.

The motive power used is that of a small hydrocarbon motor, operating on the same principle as the gas-

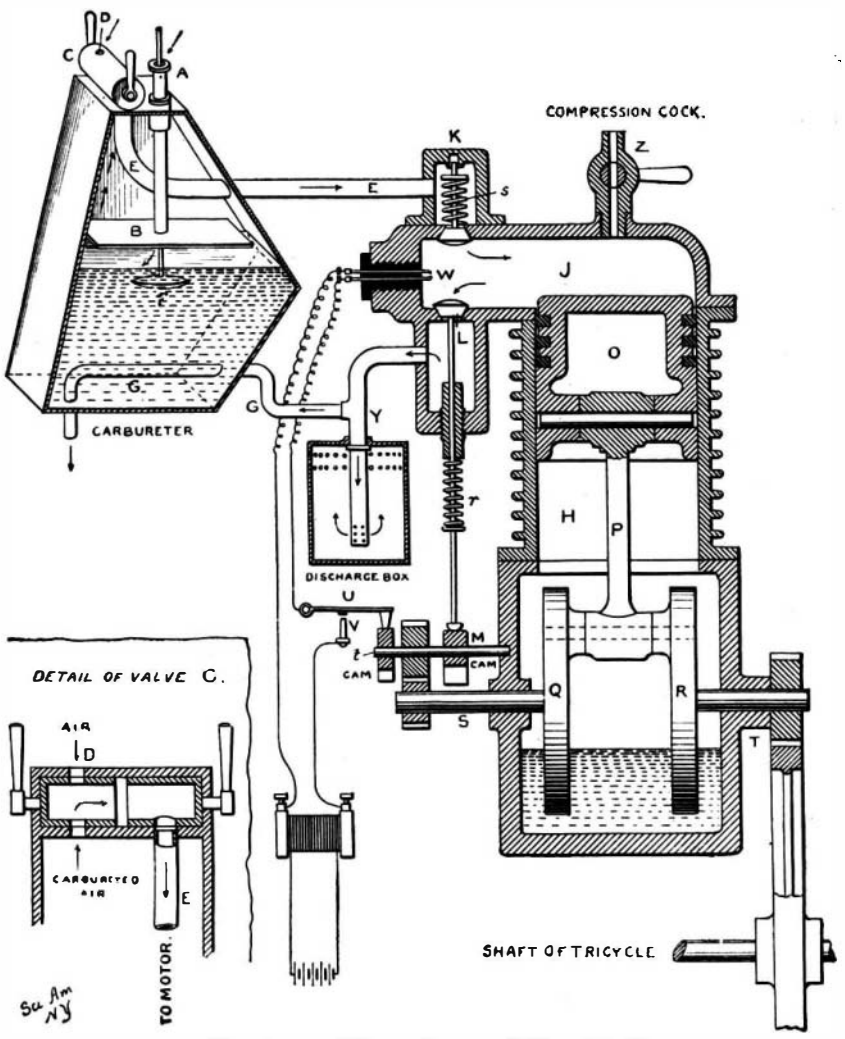


Fig. 1.—SECTION OF TRICYCLE MOTOR.

engine, the gas being furnished by the evaporation of gasoline contained in a vaporizing chamber, and then mixed with air to form an explosive mixture, which is then conducted to the chamber of the motor, and which by its explosion at proper intervals operates the piston.

The action of the motor will be seen by referring to the diagram shown in Fig. 1. To the left is the vaporizing chamber or carbureter, in which the gasoline contained in the lower half is brought into contact with the air entering by the tube, *A*, and made to pass between the horizontal plate, *B*, and the surface of the liquid; the carbureted air then rises, as shown by the arrows, and enters the double valve, *C*, shown below in detail, by which it is mixed with an additional quantity of air, which enters by the orifice, *D*, at the top; the mixture then passes to the motor by means of the tube, *E*. The admixture of air is regulated by the handle on the left, and the supply of gas by that on the right. The float, *F*, serves to indicate the level of the gasoline in the carbureter by means of a rod which passes through the tube of admission; and the tube itself is arranged to slide up and down in order to maintain a constant difference between the horizontal plate and the surface of the liquid, this plate being attached to the lower end of the tube. In order to avoid the cooling of the gasoline by evaporation, it is warmed by means of the tube, *G*, through which passes a portion of the hot gas escaping from the motor. By this means a nearly constant temperature is obtained for a given speed of the motor.

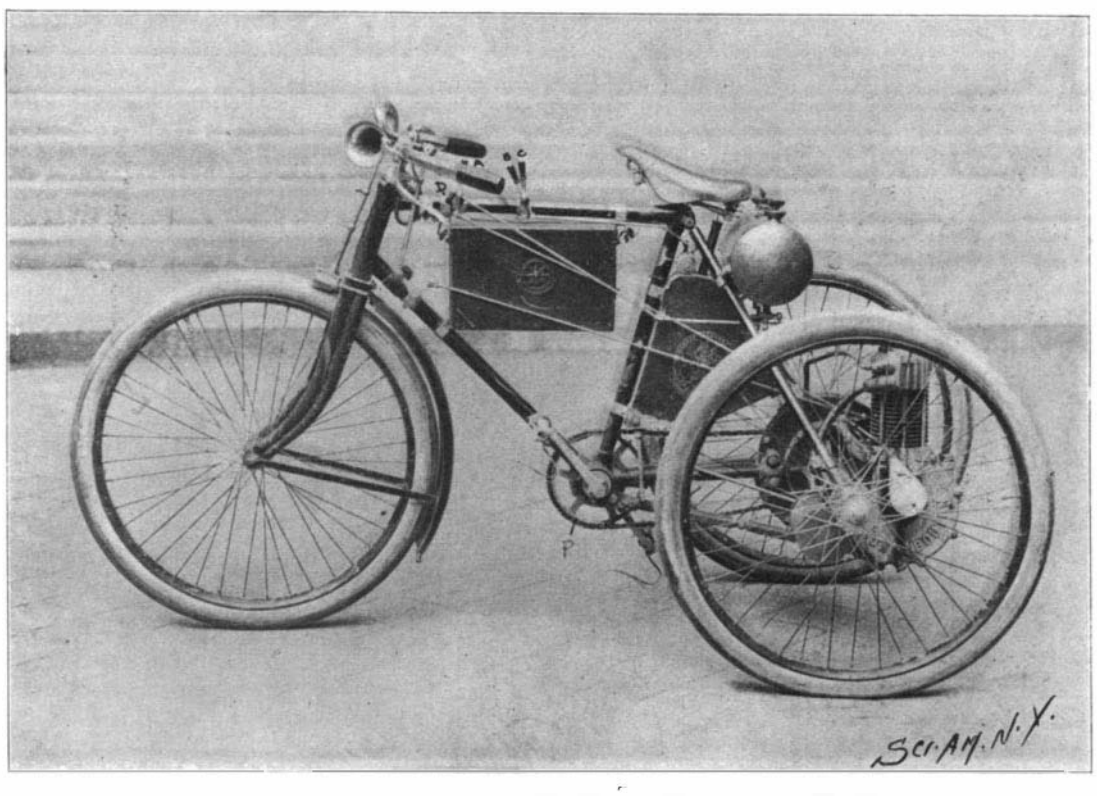
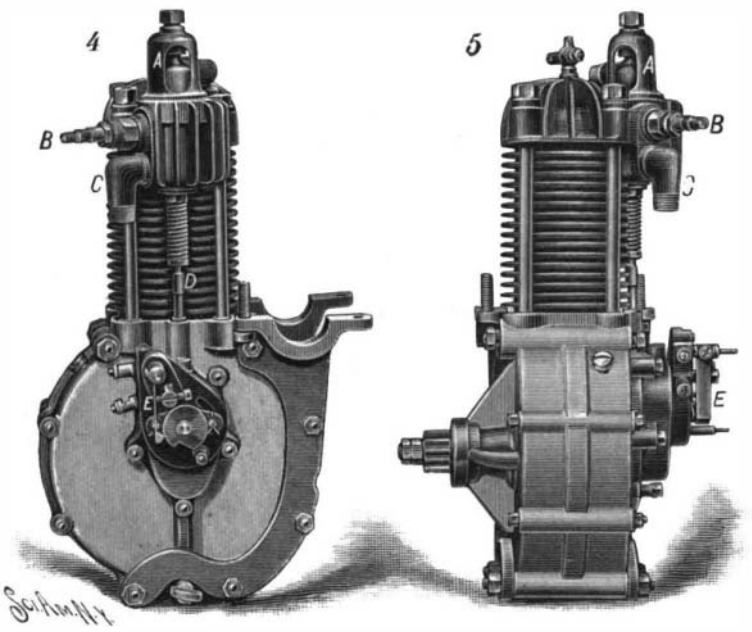


Fig. 2.—THE DE DION-BOUTON AUTOMOBILE TRICYCLE.

The cylinder, *H*, of the motor is of cast steel, with projecting flanges which serve to increase its radiating surface and prevent overheating; above is the chamber, *J*, in which the explosion of the gas takes place; at the top of the chamber is the valve, *K*, which admits the gas coming from the carbureter; the valve is normally closed by means of the spring, *S*, whose pressure is regulated so as to allow the valve to open upon the descent of the piston. Opposite is the exhaust valve, *L*, which permits the waste gases to escape after the explosion; to the valve, *L*, is attached a rod which passes through the cover of the exhaust chamber and engages with a cam, *M*, which, by pushing up the rod, opens the valve at the proper instant, this valve being normally closed by the spring, *r*. At *W* is shown the igniter, consisting of two copper rods passing through an insulating bushing and so arranged as to allow a spark from the induction coil to pass in the interior of the chamber for the ignition of the gas. The piston, *O*, is a hollow steel casting provided with three packing-rings, and carrying the wrist-pin. The piston is connected with the inclosed fly-wheels, *Q* and *R*, and with the shafts, *S* and *T*, by means of the piston-rod, *P*. The shaft, *S*, carries a pinion which engages with another of twice its diameter, operating the small shaft above, *t*, which carries two cams; the cam to the right serves to open the exhaust valve once in every two revolutions, while that to the left acts upon the lever arm, *U*, carrying the contact, *V*, of the induction coil, by means of which a spark is caused to pass at *W*, thus igniting the gas contained in the chamber of the motor.*

This induction coil is operated by four dry piles. From the preceding description the action of the motor



Figs. 4 and 5.—MOTOR FOR DE DION-BOUTON TRICYCLE.

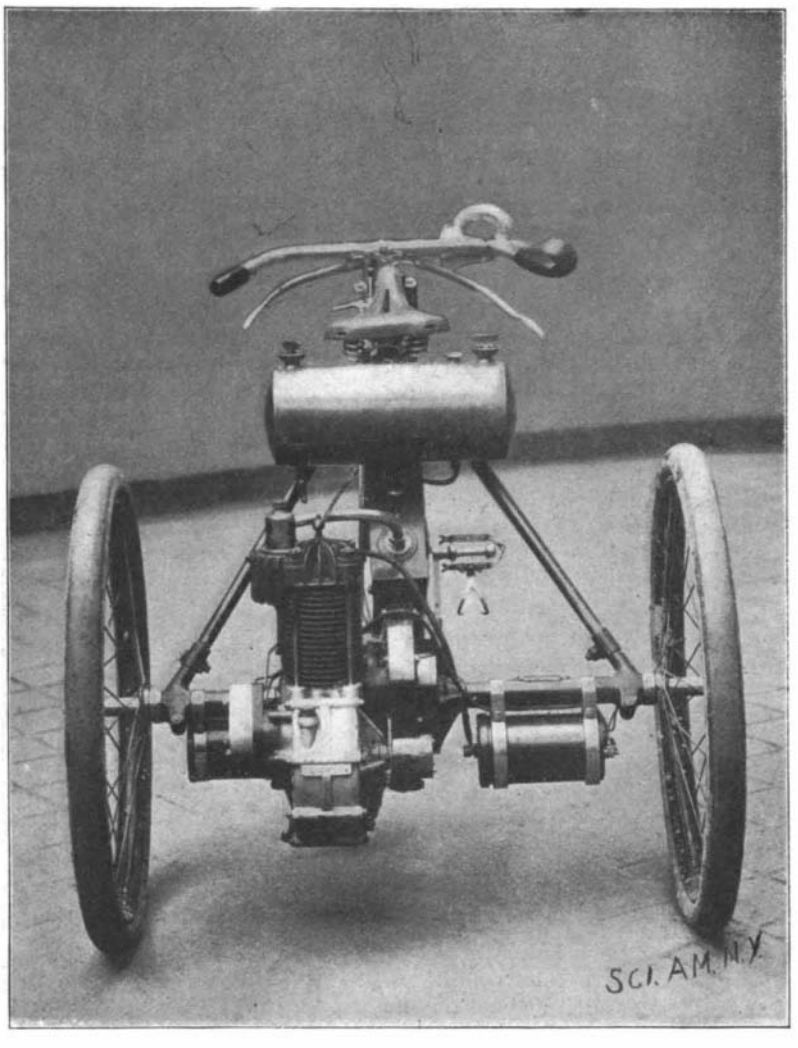


Fig. 3.—REAR VIEW OF TRICYCLE SHOWING MOTOR.

will be readily understood. When the piston descends, it produces a vacuum in the top chamber, by the action of which the valve, *K*, opens, admitting the detonating mixture from the carbureter; when the piston rises, it compresses this gas and the valve of admission closes. At the instant of the second descent of the piston the cam actuates the lever, making contact with the induction coil, upon which a spark passes, causing an explosion of the gas, which pushes the piston with sufficient force to cause it to pass twice through the same position; when the piston rises after its descent, it compresses the residual gases of explosion, and at this instant the cam, *M*, lifts the exhaust valve and the gas

* Shaft, *T*, carries a pinion which engages with a gear wheel on the shaft of the tricycle.

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.

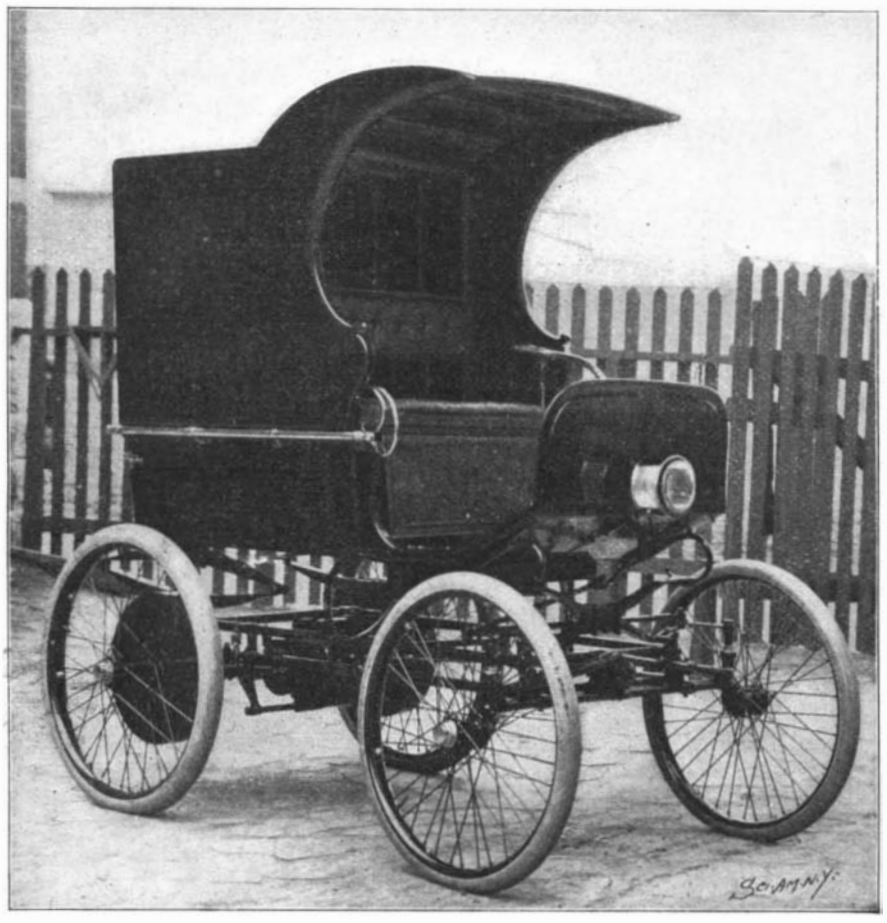
The Waltham Manufacturing Co., of Waltham, Mass., will exclusively sell the product of De Dion-Bouton & Co. in the United States, and in addition to selling the regular machines now manufactured by De Dion-Bouton & Co. they will import the De Dion motors and make a complete line of "Orient motor cycles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

Paris. E. BERNARD.

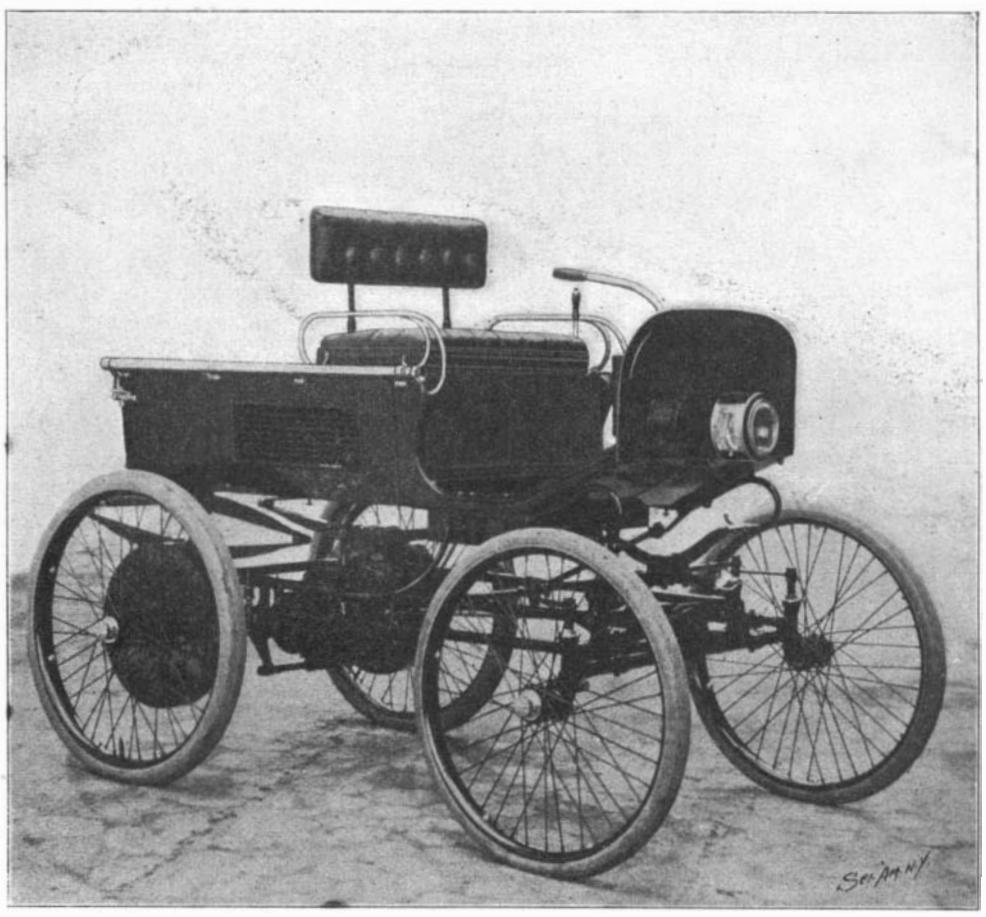
A COMBINATION PLEASURE AUTOMOBILE DELIVERY VEHICLE.

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 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.



INDIANA BICYCLE COMPANY'S CONVERTIBLE MOTOR DELIVERY WAGON



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

Value of Trade Marks in the Philippines.

According to a Consular Report which has just been 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.