

The Pierce "Arrow" Tonneau.

inches; length over all, 11 feet; width of vehicle over mud guards, 5 feet 8 inches, and height of seat from ground, 3 feet 6 inches. The wheels are of the artillery type and axles are ball bearing,  $\frac{3}{4}$ -inch balls being used. The steering wheel and transmission gear are also ball bearing. The transmission has sliding gears running in oil. It gives three speeds forward and reverse. A single cone clutch engages the flywheel. All gear changes are made by one lever. Power is transmitted to rear axle by bevel gears with special ball thrust bearing and flexible shaft to gear box. The under frame is of extra heavy tubing and this frame and the body are supported by four extra long semi-elliptic springs.

There are two hub brakes, which can be locked in position and which are double-acting. There is also a double-acting brake on the transmission shaft. All motor and transmission connections are made with flexible joints, and all brakes interlock with the clutch, so that when any of them is applied the motor is disconnected.

The water tank is placed in front of the engine and quite close to it, making water pipes very short. There is space for luggage under the tonneau seats. The car is completely equipped with rubber mat, aluminum mud guards, two acetylene headlights, two oil lamps on dashboard, horn and tools.

The Stanhope is equipped with a 6½ H. P. motor of the De Dion type. It weighs, loaded, 1000 pounds, and is 8 feet 6 inches long; 5 feet 10 inches in wheel base; 4 feet 6 inches in tread; 5 feet 8 inches wide over mud guards, and the seat is 3 feet 7 inches from ground, and 39 inches wide. Twenty-eight-inch artillery wheels and 3-inch tires are used. It also has ball bearing rear axle, steering wheel and transmission gear shaft. The under frame is of extra heavy tubing. Motor is located in rear with direct drive on rear axle.

Two forward speeds and reverse are obtainable. The gasoline tank is of copper and is placed under the seat. It holds enough for nearly 100 miles' running. The carriage body and under frame are supported by four full-elliptic springs, with special three-point suspension. Equipment includes rubber apron, mud guards, mat, three oil lamps, bell or horn and tools. Top can be furnished extra.

### Thomas Automobiles and Auto-Bis

We illustrate herewith a new model shown by E. R. Thomas Motor Co., 1192-1200 Niagara street, Buffalo, N. Y. This is a tonneau, cataloged as Model 17 and listing at \$1250. They are also putting out a Model 18 Tonneau at \$1400.

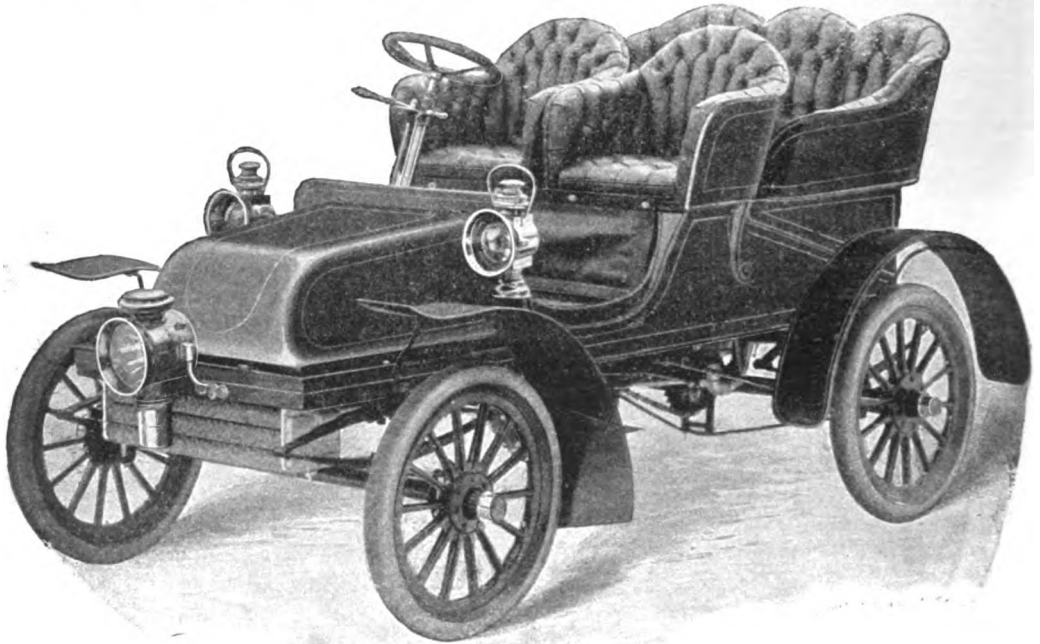
The motor is a medium speed four-cycle 8 H. P. engine, ignited by jump spark. The cylinders are bored accurately to a uniform size and faced to a length gauge. Cylinder and valve chambers are cast integral and are water jacketed as is also the head. In case of wear the cylinder can be rebored without disturbing other parts of the machine. The crank case is cut in one piece and the cylinder bolted to it. It is open on top, exposing the moving parts. Journals are placed at an angle of 45 degrees and bearings are wide and of large diameter. The valve mechanism is operated by one cam and two rods. The exhaust lift is operated by a crank and cam, which permits of very easy starting. The inlet valve can be removed by loosening two nuts, and the exhaust valve is exposed at the same time. Both are mechanically operated. The pistons are turned to gauge and four rings are used, equal in width to the usual three. The connecting rod is of steel

and bronze and is so fitted that the slightest bit of lost motion can be taken up. An oil runway in the wrist pin provides sufficient lubrication. The crank shafts are of forged steel, finished to standard gauge size in special fixtures. Thus interchangeability is assured. The flywheels are finished all over and evenly balanced. The two-to-one cam gears are very quiet running and accurate. The smaller ones are of rawhide with brass sides and the larger one of cast iron. The cams are of steel castings with bronze bushings, and are turned to gauges.

The running gear frame is of angle iron sides with steel cross bars riveted on, forming a compact and substantial whole. Knuckles and joints are drop forged. The front tube is 9-gauge, 2 inches in diameter and the

are of copper and circulation is aided by pump geared to the motor.

Model 18 includes in its improvements the French system of speed changing gears, giving three forward speeds and reverse. Motor is 8 H. P., crank shaft is 1 3/8 inches diameter, flywheel 18 by 3 inches, 140 pounds weight. Wheel base is 6 feet 6-inch; tread, 4 feet 4 1/2-inch. Strong platform springs are used with heavy forged clips. Chain is 1/2 inch wide, 1 inch pitch, 9-16 inch roller. Ball and roller bearings are used. The speed gear works direct without bevels and gives 8, 18 and 25 miles per hour. A multiple lubricator is on dashboard in full view. Water tank and gasoline tank each hold enough for 200 miles' running. The frame is of taper steel, side plates being 3x1 1/4 inches reinforced with



The Thomas Tonneau, Model 17.

rear tube is 2 1/4 inches in diameter. The wheel base is 6 feet 6 inches, tread is 4 feet 6 inches and wheels are 28 inches in diameter. The latter are of the artillery type and fitted with 3-inch tires. The rear axle is solid, 1 1/4 inches in diameter, and key-wayed to receive the wheels and compensating gear. The compensating gear is composed of eight well-fitted gear wheels. The rear axles are trussed in front and underneath. Ball bearings are used.

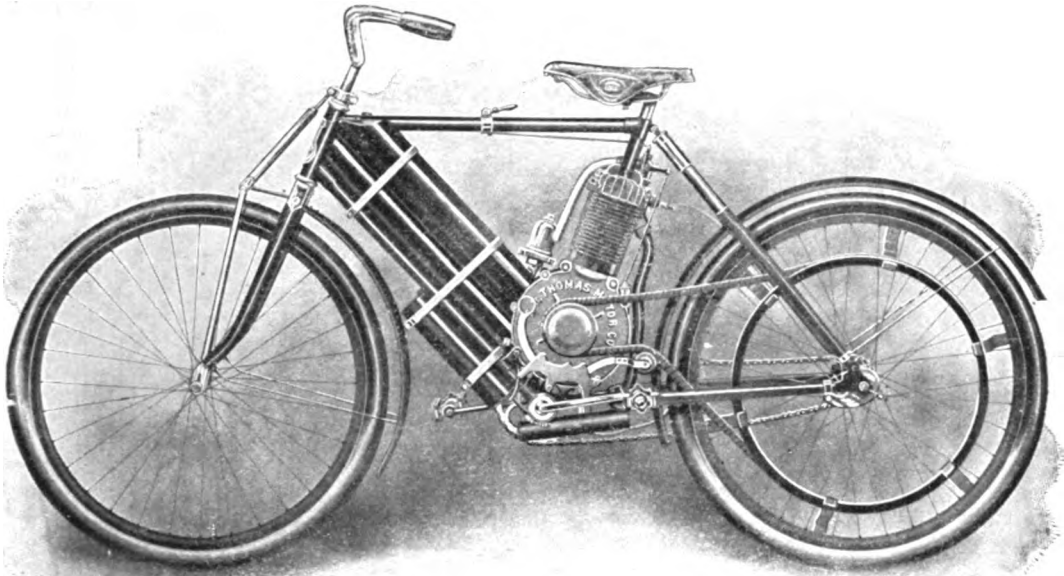
The body is easily removed by taking out four bolts. The front seats are individual and are wide and roomy, with high circular backs. The tonneau is detachable and the seats have high backs. The door is also high, assuring comfort and safety. All seats are luxuriantly upholstered in hair stuffed leather, with spring backs and cushions. Wide aluminum plough-share mud guards are provided. Tanks

angle iron riveted to the side.

Front axle tube is 2 inches by 8-gauge and rear 2 1/4 inches by 8-gauge. Compensating gear caps are 12 inches in diameter by 4 3/4 inches wide. Yokes and knuckles are drop forged steel. Three-inch detachable Diamond tires are used and a Raymond double acting brake. The finish is London smoke color.

#### THE 1903 THOMAS AUTO-BI.

The three most important improvements in the Thomas Auto-Bi for 1903 are the spring truss fork, the Hygienic Cushion Frame and the steel and leather belts. The latter they claim to be unstretchable and unbreakable, combining the good points of both the chain and the belt without the drawbacks of either. It has been tested by two thousand miles' riding over all kinds of roads without stretching or showing signs of wear. Patents have been



1903 Thomas Auto-Bi

applied for on both this and the spring cushion truss fork construction. This new fork gives all possible insurance against accident by breaking and also relieves the hands of the strain and vibration generally experienced. The well known Hygienic Cushion Frame is another important improvement on the 1903 Auto-Bi and one that will no doubt be greatly appreciated.

Besides these three main changes there have been several minor ones, including larger exhaust, longer springs on trembler fulcrummed at the lower part of the controller box; cone-shaped fibre washers on contact screw fastening; larger outlet for refuse oil; corrugated pulley wheel on engine, automatic spring idler, improved mixer and other features of less importance.

The frame is 22½ inches, wheels, 28 inches; tires (Goodrich Motor Cycle), 13¼ inches; wheel base, 48½ inches; head tube, 5½ inches, and weight, 90 pounds. Thor hubs of special

construction are used. The tubing is Shelby weldless, 1¼ ins. by 16-gauge and reinforced. A forward extension L seat post is used and a Kirkpatrick hammock saddle. One lever controls the speed and the exhaust lift. The switch is in the left handle-bar.

The machine is fitted with a Thomas 2½ H. P. motor, forged flywheels and bearings in same piece. Cylinders are lapped and pistons have three rings ground true. A Splitdorf coil induces the current. A V-shaped pulley is used on the rear wheel. Sufficient gasoline for 200 miles running can be carried in the tank.

### A Buckboard Waltham Manufacturing Co.'s Star Exhibit

Waltham Manufacturing Co., Waltham, Mass., sprung a surprise on the trade by exhibiting a car about which they had purposely



The Orient Buckboard.