

The New Toledo Steam Carriage.

The Toledo steam carriage was first exhibited to the public at the Automobile Club's show, Madison Square Garden, last November. The vehicle there shown was the original model. Before placing the machine on the market the manufacturers subjected it to severe and prolonged tests, and as a result of these tests made quite extensive changes in the design, although

into the inner shell at the water space, all on the same level and spaced equally over the circumference. The upper ends fasten similarly into the same shell at the steam space. The tubes discharge into the steam space in such a manner as to form a regular centrifugal separator, thus insuring dry steam. A special joint on which patent has been applied for is made use of. The boiler has a $1\frac{1}{2}$ -inch asbestos covering, which is protected with a sheet of

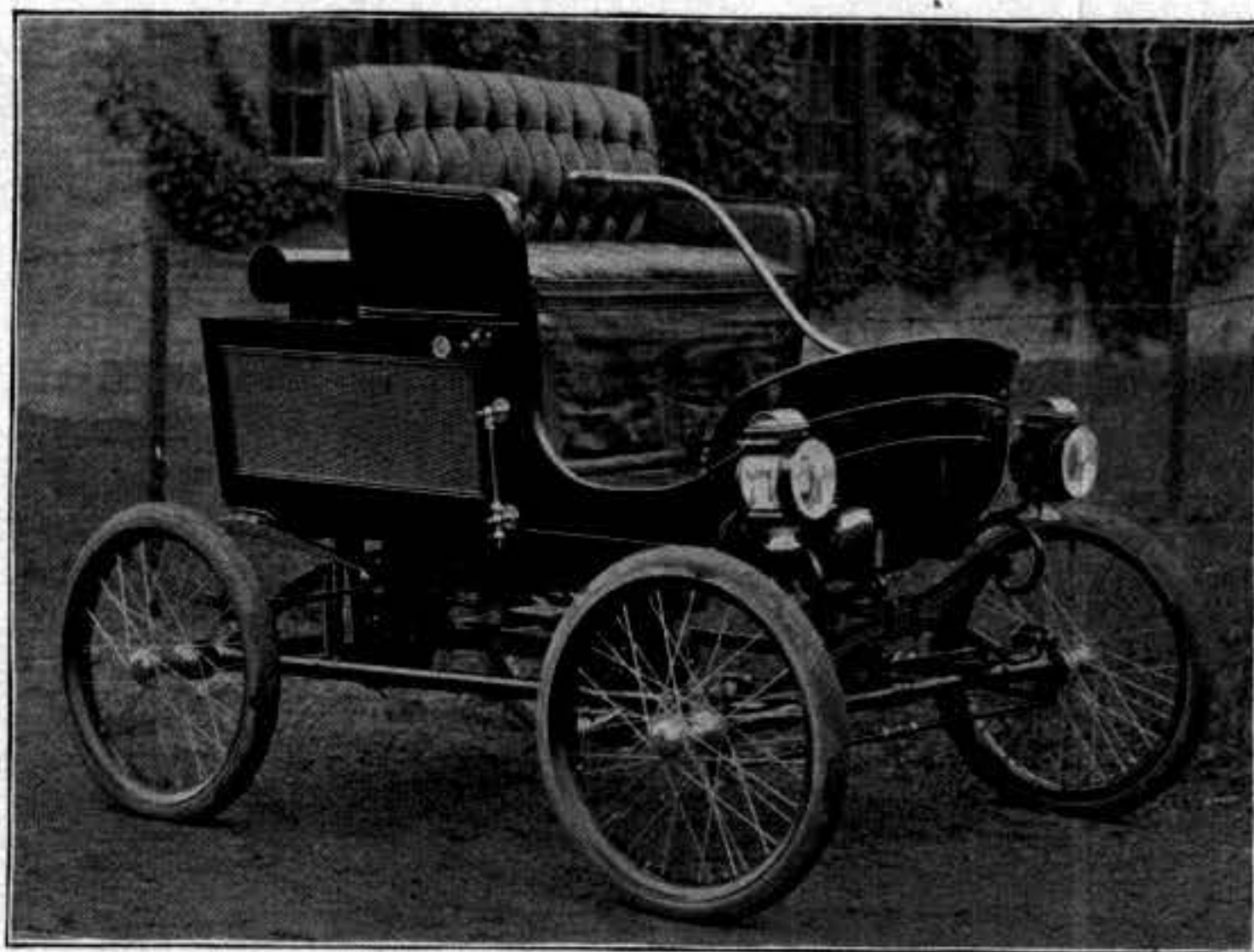


FIG. 1.—THE CARRIAGE.

most of the special features were retained in principle.

The boiler is of the water tube type, with 38 square feet of heating surface. The form of construction makes the heating surface very efficient and it is figured that 5 square feet will develop 1 horse power. As to the relative evaporating efficiency of water tube boilers, the manufacturers state that repeated trials of the British Torpedo Boat Service have shown that in large boilers 1 horse power may be obtained for every $1\frac{1}{2}$ square feet of heating surface. The boiler has an outer water space formed by two seamless steel shells having a bolted joint above and below; no rivets are used in the construction. The water tubes, of $\frac{5}{8}$ -inch diameter, are formed into eight coils, slightly conical in form and placed one above the other. The lower ends of these coils fasten

blue Russian iron, giving it a neat and finished appearance. The dimensions over all are 22 inches diameter and 19 inches height. Three brackets are fastened to the outer shell of the boiler and by means of these it is supported on a tubular steel suspension, which adds greatly to the rigidity of the frame.

The burner is a bronze casting, and is fed by air pressure in the regular manner. It has a pilot light which burns continuously.

The water is contained in a copper tank occupying the rear part of the carriage body. The total water capacity is 35 gallons, and this is claimed to last for 30 miles on good roads. The water tank is provided with an injector and 12 feet of rubber hose is furnished with each carriage. By this means the tank can be filled from any roadside pond or water trough in five minutes. The water is pumped into the boiler by a plunger pump driven from the engine crosshead. This pump has ball valves, which, it is claimed, avoid one of the most troublesome features of the ordinary boiler pump. An auxiliary hand pump is connected with the steering lever and operated by it. The downward motion of the lever now forces the water into the boiler instead of the upstroke as in the original carriage; this makes the operation of the pump more convenient. Before passing into the boiler the water flows through a heating coil combined with the exhaust muffler, which is placed on top of the boiler. The muffler, made of an aluminum casting, is of a flat cylin-

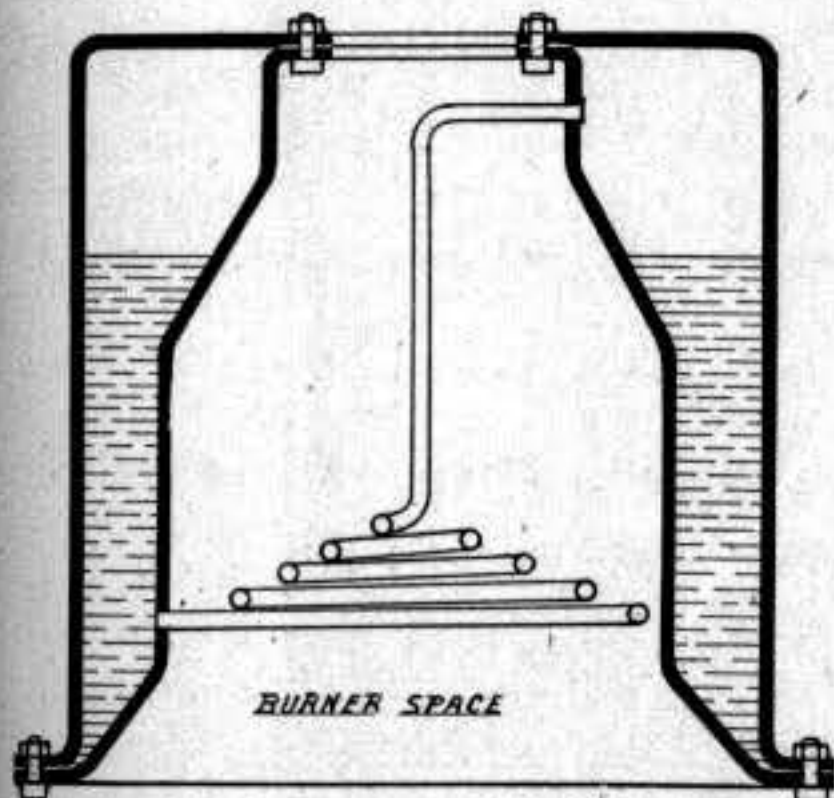


FIG. 2.—SKETCH OF BOILER, SHOWING ONE OF THE LIGHT COILS.

joint and is held parallel with the rear axle by means of a strut. The power is transmitted to the rear driving axle by two $1\frac{1}{2}$ -inch pitch chains of $\frac{5}{8}$ inch width of block, the reduction being in the ratio of $2\frac{1}{2}$ to 1. The rear axle consists of one straight and one arched member, the driving axle being surrounded by a tube. The differential gear is inclosed in an aluminum casing and runs in oil. The front axle is a plain straight tube and the two axles are connected by two tubular reach bars with flexible joints. The wheels are of the bicycle type, 32 inches in diameter and fitted with 3-inch pneumatic tires.

The band brake acting on a drum on the differential gear is double acting and can be locked to hold the vehicle on a hillside.

The body is hung on elliptic springs in the rear and on an inverted elliptic spring in front. The frame is built up of hardwood and the panels are of aluminum. The entire front of the vehicle, including the dash, is an aluminum casting. The part of the body to the rear of the seat is covered by an aluminum plate, which is enameled the same as the panels and, it is claimed, will not blister.

The seat is upholstered with curled hair and hand buffed leather and the whole vehicle is quite attractively finished. The writer was told that the engines are run for two days upon a testing stand before being placed in the carriage and that the vehicles before being varnished are subjected to test runs under severe conditions, aggregating about 50 miles in length.

The Toledo carriage with all supplies on board weighs 1,450 pounds and is probably the heaviest steam carriage regularly manufactured.
