cated to the wheels. It is certainly not without its advantages.

Steam Vehicles at the Automobile Show.

By Jos. W. Jones.

THE LANE.

A few comments on the Lane automobile. The new design of surrey shown by this concern impresses one very favorably. The No. 2 runabout also makes a smart appearance.

A very nice specimen of steam engine used in these carriages is shown separately; also parts of the engine. A detail of construction of special interest is the crank shaft of the engine with counterbalanced cranks, which is made complete with sprocket and eccentrics from one piece of steel. This is the finest piece of work shown in any automobile engine I have seen and is worthy of special notice. I am rather skeptical regarding the construction of the crosshead and slides, the slides being formed by two vertical steel rods, about 3/8 inch diameter, for each crosshead; crossheads fitted with double sleeves, but with no provision for wear. The four slides all come in a straight line with each other, so that the wear does

not pull against first one slide and then the other, but is on both slides at the same time, so that the wear would probably be slight. Water and air pumps are provided on the engine.

A sample of the burner used on the above carriages is also shown. In construction it is entirely different from the ordinary gasoline burner. It might be described as having a large central tube or manifold extending across the burner casing, from which small tubes of about ⅜ inch diameter extend to the periphery of the circle, separated from each other by about ¼ inch. A mixing tube extends into the large centre tube. The gas finds its way into the small tubes and issues through small perforations on the upper side of the same. Very good results were attained with this burner in the recent Endurance Run.

The Toledo steam carriage, Model D, presents a new design for a touring carriage, and is a decided improvement over the curved metal dash on their regular type. The Toledo surrey is quite the nicest in the show as regards design. The

MORGAN WATER TUBE BOILER,

which is used in all Toledo carriages, is conspicuously displayed in full size, in section and also in miniature sectional models. The design of this boiler is too well known to all readers of this journal to necessitate description; a feature, however, which has not been described is the means provided to artificially increase the circulation of water in the boiler and circulating tubes. The water in the shell of the boiler is given a rotary movement by projecting the upper end of the circulating tubes downward about 3 inches at an angle of 45°, and by placing small dams or scoops in direct line with this circulation water is thrown directly into the tubes. It is claimed that this centrifugal circulation assists the separation of the water and steam materially and forces more water through the tubes.

These boilers are now all being fitted with superheating coils, and provisions made for blowing off any dirt or precipitated matter. These boilers impress one as rather large and heavy in proportion to their heating surface and capacity, the construction necessitating two heavy shells, one inside the other.

The engines used in these carriages are put up in a very substantial and workmanlike manner. They are of the usual type of automobile engine. The crosshead and slides are provided with sufficiently large wearing surfaces to prevent the need of any adjustment. The connecting rods are made with moving head and solid crank end; wearing surfaces are provided with bronze bushings, which can be removed and new ones substituted in case of wear at small expense.

It is claimed that the engine will produce a horse power on 24 pounds of water per hour. A muffler and feed water heater is placed above the boiler, delivering the feed water at a temperature of 208°, with a saving of 15 per cent. in fuel, so it is said. This muffler is in the form of a flat pin shaped casing about 2 inches high and of the diameter of the boiler. The exhaust from the engine passes into this muffler, and by means of eight partitions is made to take a circuitous route before it can escape. A coil of pipe is also placed in this casing, through which the feed water is passed. The combined muffler and feed water heater is placed above the boiler, so that the hot gases from the boiler pass under it, and it is said that the exhaust is to some extent superheated, helping to render it invisible. It seems, however, as if the feed water heater would absorb more heat from the steam than the steam could take up from the waste the gases through the muffler shell. A very interesting exhibition of the operation of a syphon or ejec-