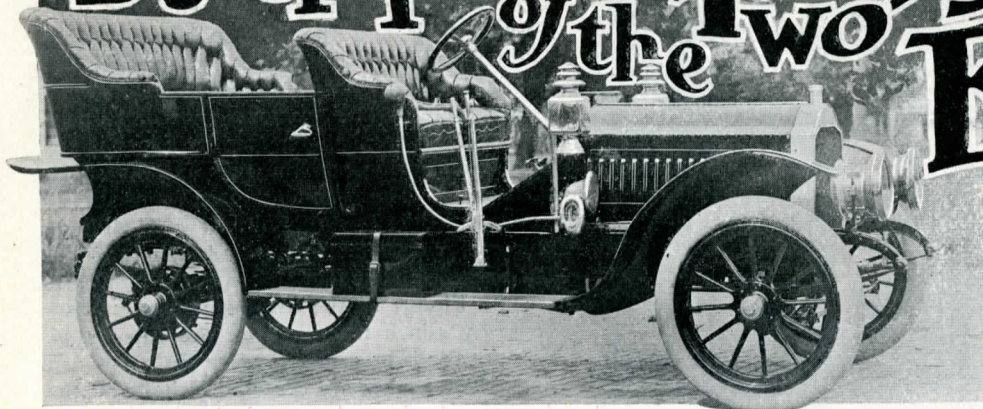


Development of the Two-Cycle Elmore



THE ELMORE "40"—THE TWO-CYCLE, FOUR-CYLINDER, "VALVELESS" CAR.

SO far as the substantial elements of their construction are concerned, the Elmore cars for 1908 are, well—the Elmore cars, for there are so many distinctive features about these consistent advocates of the two-cycle principle that nothing short of this suffices to describe them in a word. Numerous improvements have been made on the models for this year, chief of which has been the adoption of the Atwater-Kent spark generator as the means of ignition. The makers of the Elmore, the Elmore Manufacturing Company, Clyde, O., had this system under test for a long while prior to its formal adoption as a part of the standard equipment of their cars, and it showed up so strongly under the most rigorous of tests that its adoption was a foregone conclusion right from the start. The installation of this system on the 1908 Elmore cars has enabled the builders of the latter to achieve results in battery economy in the running of their cars that are almost incredible. As a matter of fact, every one of the carefully conducted tests made by the company showed that it was possible to get more than 2,000 miles' running out of a single set of six No. 6 dry cells, which is said to be many times greater than the average mileage obtainable with any other ignition system employing dry cells as the source of current supply.

The builders of the Elmore still retain the distinction of being the only makers turning out a three-cylinder car, this being their 24-horsepower model, known as the Elmore 30, which is listed both as a touring car and a roadster, the chassis being the same in each case. The heavy car of the line is the Elmore 40, which is the four-cylinder type rated at 40 horsepower. Some of the changes in design made since the preceding year are the placing of the steering arm of the knuckle above the axle instead of below as in the former years, thus protecting it from injury when traveling over rocky roads or bad country. The hubs are now made extremely large, and the balls and hubs of the bearings are now made larger than was the case in last year's models. The belt drive of the oiler has been done away with in favor of a more positive and reliable drive. An im-

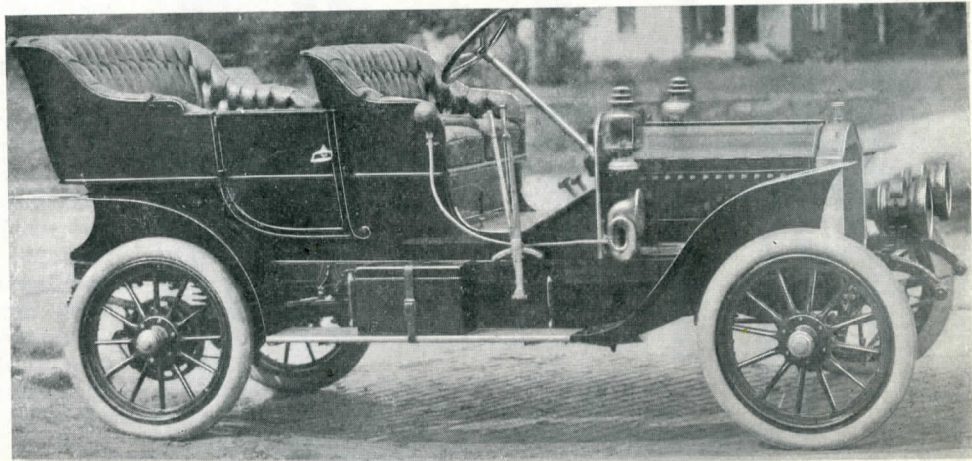
proved type of irreversible steering gear has been

adopted, this being so constructed that all lost motion due to wearing of any of its parts can readily be compensated for by a simple adjustment. The power plant and all the elements of the transmission, such as the clutch, gear box, propeller shaft and rear-axle unit, have been brought practically into the same horizontal plane, thus mini-

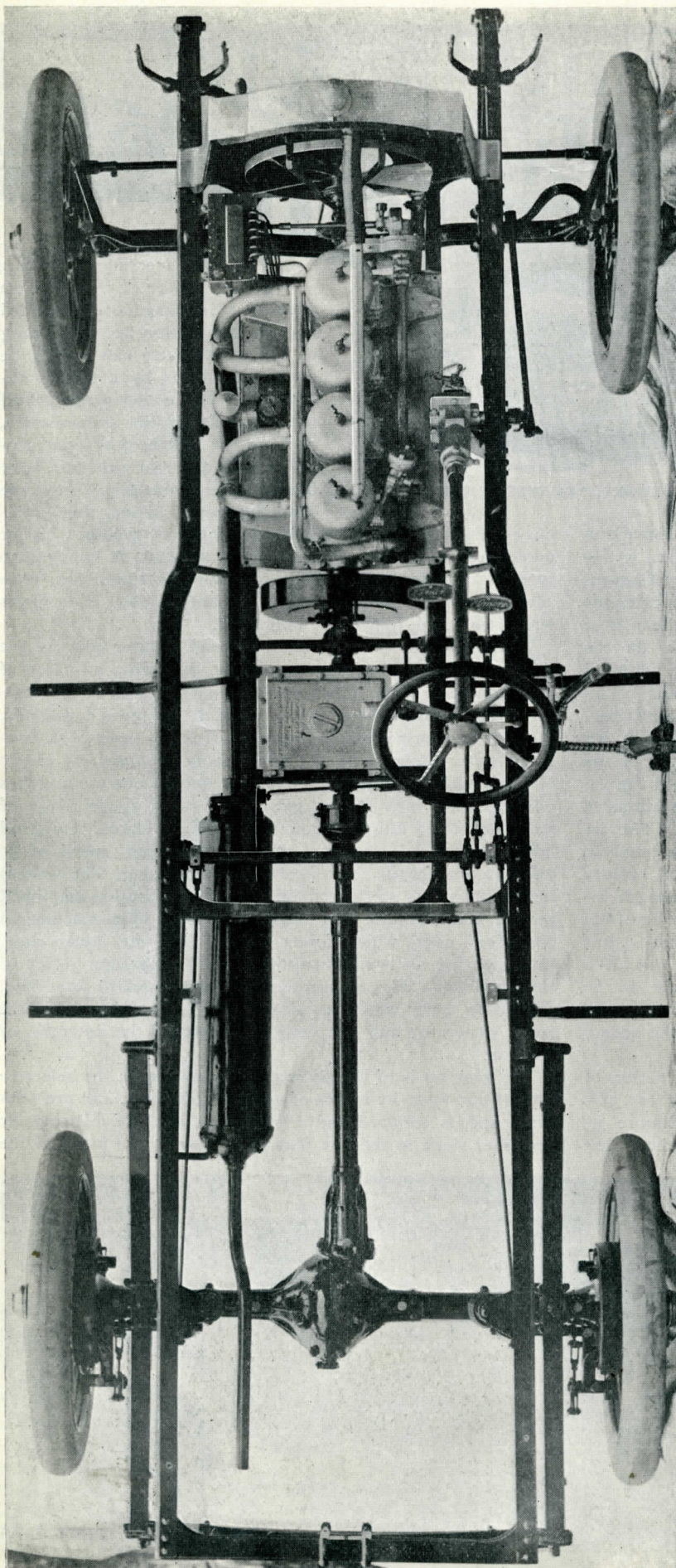
mizing the wear on the universal joints and giving a higher percentage of efficiency at the rear wheels. A honeycomb type of radiator constructed of seamless tubes has been adopted, thus eliminating the frequent trouble from leaks where soldered joints are employed.

Where the motor itself is concerned, lighter pistons are now used than was formerly the case, this being also true of the connecting rods, which are now one-piece drop-forgings. So far as the principle or operation of the motor is concerned, there have been no radical changes. It is the three-port, two-cycle, water-cooled type, the water being circulated by means of a gear-driven pump. The cylinder dimensions are 4 inches bore by 4 1-2 inch stroke, giving the car a speed range of from four to 45 miles an hour on the direct drive. On good level roads, these cars can attain a maximum speed of 55 miles an hour, while their flexibility is surprising. The makers lay special stress on the reliability of the lubrication employed on the Elmore cars, this taking the form of a mechanical force-feed oiler, which forces the oil into the intake pipe, thus insuring an even distribution of the lubricant to all of the cylinders. The carburetor is of the standard float-feed, automatic type, while, as already stated, an Atwater-Kent spark generator and dry cells take care of the essential of ignition.

The gear-set is of the sliding type working on the selective plan of operation by means of a single side lever, and provides three speeds forward and reverse, the final drive being by propeller shaft to the live rear axle. Shafts are fitted to the



ONE OF THE FEW THREE-CYLINDER CARS MADE HERE—THE ELMORE "30."



SHOWING THE GREAT SIMPLICITY OF THE ELMORE CHASSIS.

differential by means of squared ends and they are supported on Hyatt roller bearings and are provided with special thrust bearings. The front axle is a single-piece drop-forging with an extra heavy spindle supported on ball bearings, the inside bearings being equipped with 3-4-inch balls and the outside bearings with 5-8-inch balls. Suspension is by means of the standard type of semi-elliptic springs forward with a three-quarter platform type of suspension in the rear, supplemented by Sager auxiliary recoil springs on the rear axle as shock absorbers. The running gear consists of wooden artillery wheels fitted with Midgely universal rims, the tires fitted being of the same size all round in the case of both cars. On the Elmore 40 the tire equipment consists of 34 by 4-inch tires, and on the Elmore 30, and the roadster as well, of 32 by 3 1-2-inch tires. The brakes are centered in hubs on the driving wheels and are of the internal expanding and external contracting types. Their efficiency is very great, either set being capable of bringing the car to a halt within a short distance, only a slight pressure being required to cause the wheels to slide. The tread is standard on both cars, the wheel-base of the Elmore 30 being 104 inches, while that of its larger four-cylinder brother is 110 inches.

The dashboard of this car is made of mahogany, ornamented with a very heavy brass moulding so placed as to be free from vibration. The toe-board angle has been raised so as to make it much more comfortable than in the previous models. The gasoline tank has a capacity of 20 gallons of fuel, while the mechanical oiler holds six pints of lubricant. As the Elmore 40 will average 12 miles to the gallon of gasoline under any ordinary touring conditions, the radius of the car is very easy to keep in mind. The specifications of the Elmore 30 and the Elmore roadster are identical, while the design and construction of both are carried out in the same thorough manner that characterizes the larger car, or Elmore 40. The latter is listed at \$2,500, while the three-cylinder car lists at \$1,750 in either type.

From the accompanying plan view of the Elmore chassis, which shows the Elmore 40 equipped with a four-cylinder, two-cycle motor, it will be quite apparent that the claims for simplicity and accessibility do not center entirely upon the power-plant, as the lines of the chassis of the car as a whole are quite in keeping with its motor on this score. There is a noticeable absence of complication or small parts, both the design and construction being distinguished by close adherence to the best standard practice, the chassis foundation consisting of the usual channel section pressed steel frame, the motor and change-speed gear being carried on a special sub-frame, while the propeller shaft is inclosed in a heavy steel tube which serves both as a protection and takes the place of the usual torsion rod. The use of the sub-frame for supporting the power-plant and drive permits of the latter being a close approach to a horizontal plane from the flywheel to the rear axle.