

AN IMPROVED GASOLINE AUTOMOBILE.

The vehicle shown in our illustration has recently been severely tested over a run of 538 miles, without a rest, during extremely cold weather, almost unendurable by the drivers.

It is a new Columbia gasoline runabout, known as Mark 8, built by the Electric Vehicle Company, of Hartford, Conn., after plans by Mr. Hiram P. Maxim, chief engineer of the company, and has demonstrated satisfactorily its durability and power in the test lately made. The total weight of the vehicle, with eleven gallons of gasoline and sundries, is 1,640 pounds. The quantity of gasoline mentioned will carry the vehicle 165 miles.

The engine is a single cylinder, Otto cycle. The cylinder dimensions are 4.6 diameter by 6.8 stroke. The complete engine, with 19-inch flywheel, weighs 240 pounds. This weight includes governor, carbureter with piping, water-cooling pump and necessary piping therefor. The engine is of the single-cylinder type having 5 brake horse power actual at 750 revolutions per minute. It is located in the front of the vehicle, as in the standard designs, as found best by long experience in Europe. It is mounted upon a separate spring-supported frame of its own.

Power is transmitted from the engine flywheel through a friction clutch operated by a pedal in the floor, also as in best European practice. From the friction clutch a shaft runs longitudinal of the vehicle, and carries four gears, three of them being for different gear reductions ahead, and one for reverse. The countershaft, to which they gear, continues to the rear axle, which is "live," and which it drives through the medium of very large and generously proportioned bevel driving gears. The entire gearing is incased in one cast-steel box, which includes the rear axle, and which positively insures the alignment of everything. That this construction is carefully worked out may be judged by the fact that at 4 horse power input at the friction clutch, the losses in transmission to the rear axle are only 6 per cent.

The gear reductions are respectively 15.2 to 1, 7.8 to 1, and 4 to 1, with 13.9 to 1 for reverse. These gears are thrown in by positive clutches, which are operated in a very simple manner by one lever projecting up at the side of the seat. The principle of control is much simplified, all the change gear functions being done by one lever. In order to insure positively against attempting to throw in changes of gear without disconnecting the engine or source of power, a very simple and ingenious interlock is provided, which makes it impossible to change the gear without first pressing forward the clutch pedal which disengages the friction clutch on the engine flywheel.

The friction clutch is a plain wind-up brake faced with leather, so that all degrees of slipping can take place without danger of cutting or running dry, insuring wearing nothing more than a leather band. This is of ample proportions so as to prolong the life before the new leather has to be put in.

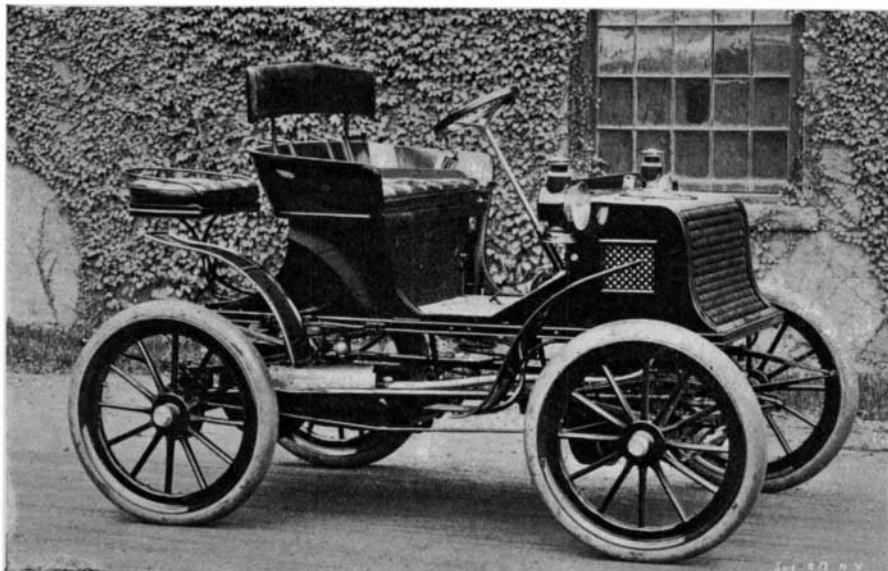
The speed of the engine is controlled by a governor. This governor operates a valve in the suction pipe. In the suction pipe beyond the governor throttle is the aspirating carbureter, so arranged that when the governor throttle opens and permits a vigorous suction a larger amount of gasoline aspirates, or when the governor throttle, by partially closing the suction pipe, reduces the vigor of the engine suction, less gasoline is aspirated. This insures a uniform quantity of gas mixture at all engine speeds.

The engine is speeded beyond its normal by means of a foot pedal control, and the ignition is automatically advanced or retarded by the engine according to its speed, so that the maximum effect is always produced from whatever charge the governor permits the

engine to get. The ignition is by the secondary current and jump spark. The primary current was generated from four cells of a special dry battery.

In the recent 500-mile run, when the climatic and road conditions were as severe as they are ever likely to be in this latitude, it was found that 14.4 miles were obtained per gallon of gasoline, the load being 2,040 pounds, including the weight of two passengers, heavy wraps and baggage.

The best average speed on this trip was 23 miles per hour, made on the west side of the Connecticut



A NEW COLUMBIA GASOLINE RUNABOUT.

River, between Hartford, Conn., and Springfield, Mass., over roads that were a succession of grades.

The vehicle ran continuously for forty-one hours, with but one stop of fifteen seconds. The trip was up one side of the Connecticut River from Hartford, Conn., and back on the opposite side, over roads nearest to and parallel with the river. Altogether, it was quite a successful trial, and proved the capabilities and economy of this type of vehicle perfectly.

SAN GIMIGNANO AND ITS TOWERS.

Massimo d'Azeglio has well said that San Gimignano is the Pompeii of the middle ages. It lies on the railway between Florence and Siena, and is beautifully situated on a hill. Like most of the cities of the Latin peninsula, it had its origin in Roman times, and in the tenth century we begin to hear of the sturdy little city, and a century or two later it was really an independent state of ten thousand inhabitants. The year 1276 marks the apogee of its political life, and



THE TOWERS OF SAN GIMIGNANO, ITALY.

the city, as we see it to-day, dates largely from this time; but in 1353 it suffered terribly in consequence of the dissensions of the leading families who belonged to the opposite political parties, and at last it became subject to Florence.

There is no town in Tuscany which presents so faithful a picture of Dante's time, and nowhere can we obtain a clearer insight into the rich development of Italian art in the earlier years of the period which

preceded the Renaissance. The tranquil architecture of the thirteenth century has not lost its freshness, and the multiplicity of the noble edifices and an air of sumptuousness on a small scale all aid in making it a delightful spot to visit. It is truly what the French call a "strong place," with its crenelated walls and towers. The towers make the city look like some Eastern town with lofty minarets, and their effect is most striking. There were originally fifty towers, but now only thirteen remain, so that the reader can imagine what it must have looked like in the middle ages.

These towers were built for defense by various families during the turbulent times when Guelphs and Ghibellines fought each other gratuitously. Adjoining the Palace is the Torre del Comune, 331 feet high. It had a mark part way to indicate the height beyond which the citizens were not allowed to build, according to a sumptuary law. The city, which now has 8,200 inhabitants, is a charming one to visit, although tourists seldom make stops there. New York, with its high buildings, really resembles San Gimignano at certain times in the twilight or in a light fog, and the skyline is most picturesque in both instances.

Experiments on Transmission of Malaria by Mosquitoes.

A few months ago Drs. L. Sambon and G. C. Low, of the Tropical Medical Institute of London, decided to establish themselves in the Roman Campagna, near Ostia, for the purpose of

studying the question of the propagation of malaria by mosquitoes. The malarial season lasts from May to the end of October, and it was during this period that the experiments were carried out. In this region no one can remain even for one night without the risk of contracting malarial fever of a very violent type. The doctors took no medicine of any kind, but simply adopted the precaution of retiring every night, one hour before sunset, to a specially constructed hut, in which it was impossible for the mosquitoes to enter; and they did not come out before one hour after sunrise. In this way they entirely escaped being bitten by the mosquitoes, which, as is well known, only seek their food at night. The British Medical Journal states that the experiment has furnished conclusive results as to the propagation of malaria by mosquitoes. On the 13th of September, Prof. Grassi, accompanied by a number of scientific men, visited the two English physicians, and found that they were able to exist in perfect health in the midst of a population decimated by malaria. They showed, therefore, that it is only necessary to avoid being bitten in order to escape contagion. The experiment, however, being of a purely negative character, it was desired to make further proof and show that the malaria would be produced in a perfectly healthy person, if bitten by mosquitoes containing the germs of the malady. This idea was also carried out. A collection of mosquitoes, which had been in contact with malarial patients at Rome, was prepared by Prof. Bastianelli, and sent to Dr. Manson at London. One of the sons of the latter offered himself as subject of experiment. Although he had never, since his infancy, been in a malarial country, he became infected and thus furnishes a striking proof of the transmission of malaria by mosquito bites.

Prof. R. T. Fessenden, of the United States Weather

Bureau, is making experiments with wireless telegraphy on the southern coast. Stations will be established at Capes Hatteras and Henry and at other coast points north of Cape Hatteras. It is the government's intention to communicate storm warnings to vessels at sea off this dangerous locality. It is also intended to send storm signals to life-saving stations when the wires are disabled. If the tests are successful, the entire coast will be similarly equipped.