seconds between the fastest and slowest mile in a fifty mile jaunt. This machine covered fifty miles in 1 hour 17 minutes and 50 seconds against 1 hour 15 minutes and 57⅘ seconds for one of the tricycles.

The other gasoline vehicles were of various types. They were designed for use on public roads, and were not equipped with sufficient power or sufficiently high gears to make a creditable showing against the racing machines. One thing was noticeable, and that was the tendency to equip these vehicles with motors of higher power than is ordinarily needed, and of regulating the speed of the vehicles, principally through controlling the speed of the motors by varying the amount of the explosive charge and the time of firing that charge. This, of course, does not permit the motors to work at their highest efficiency except during a small portion of the time. Almost all were equipped with reducing gears to facilitate hill climbing and progress over exceptionally bad roads. The road-going qualities of these vehicles are attested by the fact that two made the journey from New York to Chicago on their own wheels and two others made the trip from St. Louis to Chicago in the same manner.

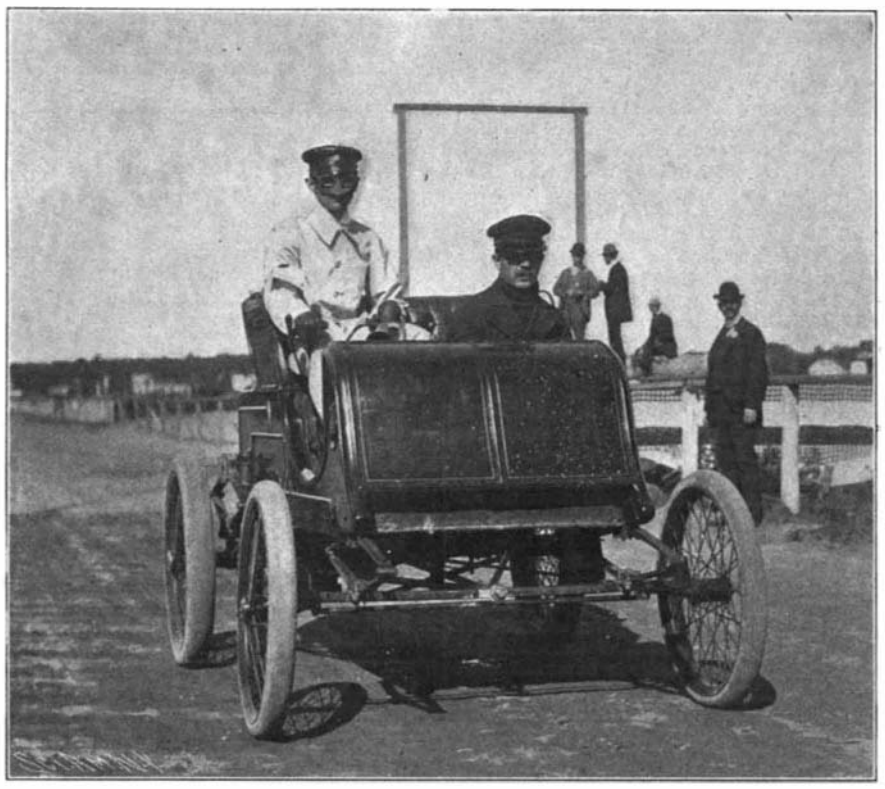
There was one make of gasoline vehicles exhibited that performed some remarkable feats, designed to impress the spectators with the perfection of control which has been obtained. These feats consisted in climbing the grades, in turning and maneuvering in remarkably close quarters, in wandering over a three-foot pile of loose timbers, and in performing a number of feats on a "teeter board." This teeter board consisted of a number of stout timbers spiked together so as to form two runways twelve inches wide. These two were braced together at a proper distance to accommodate the gage of the wheels, and were laid over a stout support, some eight feet high. With one end of this teeter resting on the ground and the other high in air, the vehicle would start up the incline, stopping at the center in such a position as to balance the teeter.

After the vehicle had played "see-saw" all by itself for a while, stevedores would put supports under either end of the teeter, a roller would be placed under one of the rear wheels of the vehicle, and it would be driven back and forth within such narrow limits as to keep the wheel on the rolling piece of wood. Then a ten-inch cube of wood would be substituted for the roller, and the vehicle would be made to climb back and forth over it, or to stop with the wheel in apparently impossible positions. To cap the climax, the vehicle would be backed over the block of wood and lowered until it was just close enough to the teeter board to crack the shell of an egg placed by an attendant, without doing more damage to it. All these feats were performed in the presence of hundreds of spectators. The vehicle is equipped with a powerful motor and friction transmission. In climbing grades the steam and gasoline vehicles showed themselves capable of overcoming grades of from 25 to 40 per cent. None of the electrics attempted a trial on the artificial grades.

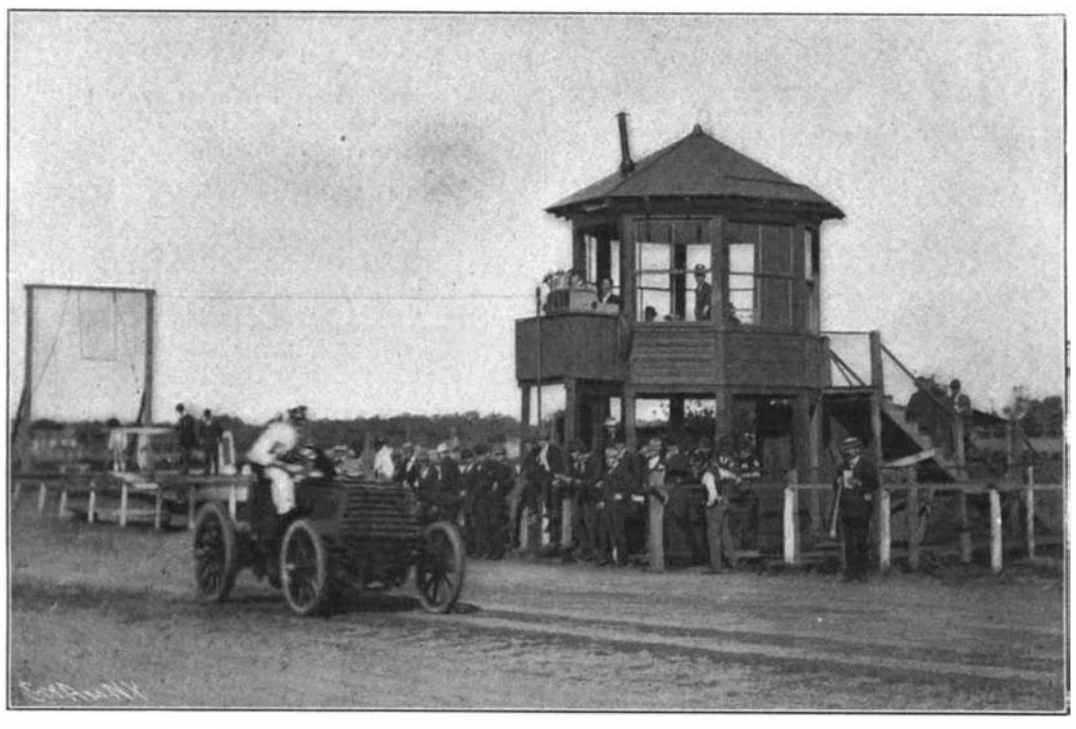
In the races none of the electrics entered for any contest of more than five miles in length, and the steam vehicles—the little racers, at least—could not be dragged into an event of more than ten miles in length. In a five mile contest between road machines the three types of vehicles were all represented for the only time. An electric led for two miles, when it was passed by a steam runabout, which held its lead to the finish, although being rapidly overtaken by the electric at this point. The steam machine started with a steam pressure of 225 pounds and finished with 25. The electric, which was gaining at the finish, was not going within ten per cent as fast as it did in the earlier part of the race, showing that the consumption of current had been considerable. This was largely due to the heavy condition of the track. The two gasoline vehicles were far in the rear, but were going as fast, or faster, at the finish than in the early part of the race, and could have kept the same gait for fifty to a hundred miles more.

THE TRI-STATE FAIR AUTOMOBILE RACES.

The mile track at Guttenberg, N. J., was the scene of most interesting automobile races on September 8, which were held on the occasion of the Tri-State Fair. While most of the contests were important, the race between the machines of Mr. A. C. Bostwick, Mr. D. Wolfe Bishop, and Mr. A. L. Riker was the most valuable. The machines were run under the rules formulated by the Automobile Club of America. Mr. Bostwick's racing machine, which is of 24 horse power and weighs 3,000 pounds, was built by Panhard & Levassor, and was originally owned by M. Renée de Knyff, and has many times shown in France that it is capable of great speed. Mr. Bishop's machine was made by the same firm, but is slightly lighter, weighing 2,200 pounds and propelled by 16 horse power motors. The race for gasoline vehicles weighing over 1,000 pounds was 5 miles. Mr. Bostwick succeeded in covering the distance in 7 minutes and 43½ seconds. At the start of the ten mile "championship" race, Mr. Bostwick was first, Mr. Bishop second and Mr. Riker third. The Riker electric racing machine weighs 2,300 pounds. Mr. Riker gradually overtook and passed the others and finished the first lap many yards in the lead. His batteries then became short-circuited, and the machine came to a stop. Mr. Bostwick gained rapidly on his remaining competitor, and at the end of the 10 miles was more than 7 furlongs ahead, the last mile being made in 1 minute 27⅘ seconds. Mr. Bostwick also operated his Winton racing machine, shown in our engraving. The machine is of about 20 horse power. The following is a summary of the principal races:



MR. BOSTWICK IN HIS WINTON RACING MACHINE.



HIGH SPEED MADE BY MR. A. C. BOSTWICK IN HIS PANHARD & LEVASSOR RACING MACHINE, GUTTENBERG.

Gasoline vehicles, four wheels, American make; five miles—Won by T. Walsh, New York; F. Nagel, New York, second; A. C. Bostwick, New York, third. Time, 10:10⅘.

Gasoline vehicles, four wheel, of less than 1,000 pounds, any make; five miles—Won by C. J. Field, New York; F. T. Craven, New York, second; J. Lauveguez, New York, third; C. S. Henshaw, Brooklyn, fourth. Time, 11:43⅘.

Gasoline vehicles of more than 1,000 pounds, any make; five miles—Won by A. C. Bostwick, New York; D. Wolfe Bishop, Newport, second. Time, 7:43⅘.

Tricycles; five miles—Won by C. S. Henshaw, Brooklyn; J. Lauveguez, New York, second; Stanley R. Atkinson, New York, third. Time, 8:24⅘.

Electric vehicles, any kind; five miles—Walkover for A. L. Riker. Time not taken.

Steam vehicles, four wheels; five miles—won by W. J. Stewart, Newark; W. L. Hibbard, Bridgeport, second; S. T. Davis, New York, third; S. Houston, Newark, fourth. Time, 11:48.

"Championship," open to first and second prizewinners in the preceding events, except the first and that for tricycles; ten miles—won by A. C. Bostwick, New York; D. Wolfe Bishop, Newport, second. Time, 15:09⅘.

Disposal of Household Waste at Paris.

The question of the household waste of the city of Paris is treated by M. Vincey in a communication recently presented to the Society of Sanitary Engineers. The amount of household waste collected each day is about 3,200 cubic yards, or nearly 56 cubic yards per mile of street; the production increases from year to year in the proportion of $\frac{1}{50}$. In 1895 the 20 districts of the city produced about 1,020,000 cubic yards of waste, whose weight gave an average of 1,235 pounds per cubic yard; the annual weight was thus 570,035 tons, or an average of 1,562 tons per day, or 1·38 pounds per day and per person. The monthly production is variable, being considerably higher in winter than in summer; it is the same for the density. In 1895 the average for January was 1,450 pounds per cubic yard, and for September, 1,200 pounds; in that year the removal of the waste cost the city of Paris nearly $600,000, or $1.08 per ton. As the previous contract expired in July, 1899, a new one was made, and the expense has risen to over $800,000 annually.

MM. DESGREZ and Balthazard of Paris have been carrying out some elaborate experiments with the object of regenerating respirable air in a confined space, and have communicated the results of their researches to the Academy of Sciences. They have constructed a diving dress of aluminium which weighs in all about twenty-five pounds. Inside this dress they place a quantity of bioxide of sodium, and a diver wearing this apparatus can walk about for a considerable length of time under water, without coming to the surface to replenish his supply of air. It is claimed that the invention will be of inestimable value to persons engaged in mines, chemical industries, or to reach certain points surrounded by a poisonous atmosphere.

The Current Supplement.

The current SUPPLEMENT No. 1292 has a number of articles of remarkable interest. "The French Navy" is an elaborately illustrated article accompanied by many fine engravings and plans. "The Westinghouse Gas Engines" is a fully illustrated article showing the internal construction of the engines. "The Inaugural Address of Sir William Turner" is continued. "Roman and Gallo-Roman Flour Mills" is a most interesting article. "Mechanical and Technical Education in the United States," by Prof. C. F. Chandler, is also continued.

Contents.

(Illustrated articles are marked with an asterisk.)