The New York Automobile Show.

The third annual automobile show to be held in this city will be open from January 17 to 24. As usual, the exhibition will be held in Madison Square Garden, which, on account of the great increase in the industry the past year, is not large enough to accommodate all who wish to make exhibits, even with the utilization of every available inch of space in the basement and restaurant. The general lines of improvement to be noted are longer wheel base, wooden wheels all of the same size, and three-speed gears on the gasoline cars.

EUROPEAN FIRE ENGINES.

In the general arrangement of the German fire engine, a horizontal motor is built in over the rear axle, so as to be easily controlled from the engineer's platform at the back. Both the driving and the pumping gear are actuated by means of independent friction clutches situated upon the elongated crank-shaft. The arrangement is such that either clutch may be used without regard to the other, so that, while the engine is running to the fire, the pumping mechanism is at rest; but as soon as it arrives upon the scene of action, the pump may be started at once. About the center of the wagon frame, and easily accessible from either side, is placed the pump. Over the forward wheels are carried the requisites, such as the hose, tools, a tank for benzine, and seats for the accommodation of four men composing the crew.

The wagon frame is made of wrought iron, and rests upon heavy elliptical springs mounted on the axles. The motor is a horizontal two-cylinder, Deutzer benzine motor, of 15 brake horse power, the ignition being by a magneto, which assures the motor's starting without delay.

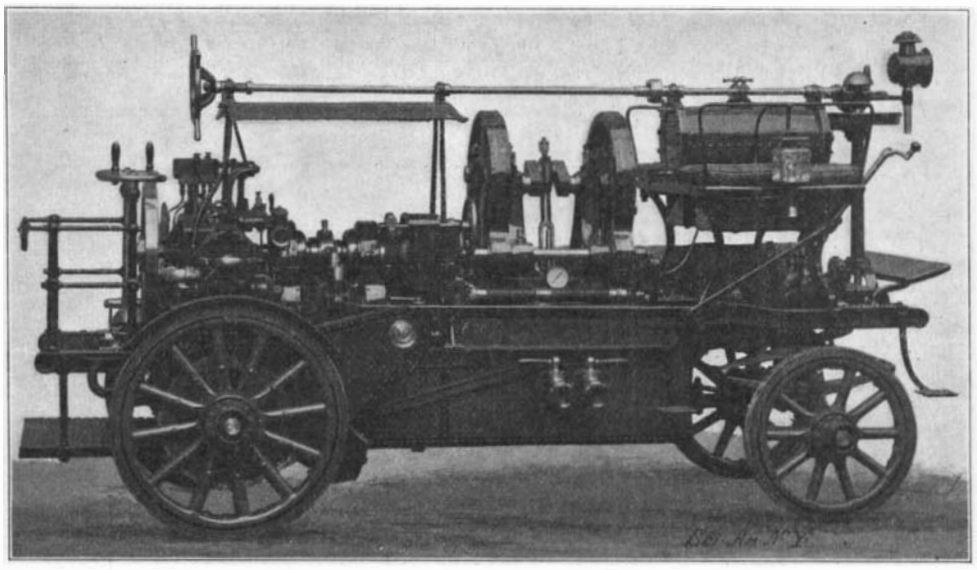
In its readiness to start this motor possesses a great advantage over a steam engine, which requires from 10 to 20 minutes to get up steam, or, to save this delay at the critical moment, incurs the expense of keeping up steam continuously in a separate boiler. Benzine is fed automatically to the engine from an air-tight tank provided with an automatic valve. Enough benzine is contained in the tank to insure a 10 hour run, using the fluid at the rate of 5 liters per hour. The water for cooling the gas engine cylinders is supplied by a separate pump, from a tank attached to the main 132-gallon pumping reservoir* under the center of the wagon. The two tanks are so connected that the cooling water may be obtained from the main one if a larger supply is needed.

An automatic lubricating device conducts oil from a centrally located reservoir to all necessary points. The control on the motor and speed clutches is easily effected from the engineer's platform at the back. The hand wheel seen operates the clutches, giving two speeds ahead of from 6 to 7½ and 9 to 12 miles per hour respectively, and a slow reverse.

The gears for furnishing these speeds consist of rawhide pinions meshing with iron or bronze gears. A chain drive is employed from the countershaft to the rear wheels.

During the run the steering is done from the driver's seat on the left side of the wagon, but it may also be done from the engineer's station at the rear. The two brakes, operating independently of each other, may also be worked from either place. All the gears are inclosed and run in oil.

The pump consists of three perpendicular brass cylinders having phosphor-bronze plungers ground to an air-tight fit. A valve chest, cast of solid brass, connects the cylinders, and contains a pair of valves for each cylinder, which open into the common suction and pressure chamber. The valves may be removed separately without the use of a tool, and returned to their proper seats or renewed in a few seconds. The suction pipe is provided with one, and the pressure pipes with two connections outside the reservoir. These connections have suitable valves and both the suction and pressure pipes have sufficiently large air chambers. In the pressure pipes of the pump are located safety and discharge valves, by means of which all surplus water may be returned to the reservoir, and the pressure at the same time be maintained constant. The safety valve is automatic and may be set for any desired pressure; the discharge valve is worked by hand, and is designed to return the water from the hose to the water tank. The pump is securely bolted to a support which lies upon the water tank and, like the latter, is firmly fastened to the wagon frame. The pump is driven by an intermediate gear, which, by means of a friction clutch, worked by a hand-wheel, engages the motor shaft. A three-cylinder pump working on cranks set at 120 deg., driven by a two-cylinder, four-cycle motor, accomplishes the greatest possible amount of work and throws a steady stream of water. With 90 revolutions of the pump shaft per minute, from 190 to 200 gallons, under a pressure of between six and seven atmospheres, may be thrown a distance of from 147 to 164 feet in the same time. In constructing the wagon frame, care has been taken to make it as light as is consistent with the requirements. The water reservoir and the cooling water tank add much to the stability of the construction. The system of steering is the same as that used on most automobiles. Two brakes engage the rear wheels; one is worked from the driver's seat, and the other is a band brake applied by a foot lever on the engineer's platform. Four seats are provided in front, under which are a receptacle for tools and a hose reel, while the suction pipes are placed along the sides. Three lanterns serve to light the road. These, when the machine is at rest, may be removed and used elsewhere.



A GERMAN SELF-PROPELLED FIRE ENGINE DRIVEN BY A BENZINE MOTOR.

LONDON'S FIRST MOTOR FIRE ENGINE.

Speed, 30 miles per hour; horse power, 25; water tank, 25 gallons capacity.

The English fire engine, propelled by steam, is giving satisfaction. It is located at the Battersea fire station, and, when running to a fire, is capable of speeding up to 30 miles per hour. Because of its short wheel base, it can turn in less than 20 feet. The steering pivots are in the center of the hubs, in order to make the machine steer easily. A single boiler, of the vertical fire tube type, supplies steam for both the propelling and pumping engines, the former of which is of 25 horse power. The general arrangement and method of control can be seen at a glance from the illustration. The controlling levers are at the front, and the engineer simply attends to the boiler, which is fired by petroleum instead of coal. The machine was built at the headquarters of the Brigade at Southwark, and will doubtless be followed by other vehicles after it has had a sufficiently thorough testing to have shown its abilities.

* A tank carried upon the engine, from which to supply the pumps, may be a revelation to those not conversant with European methods. A peculiarity of the above fire engine, which seems to be common to most appliances of this kind built on the other side, especially among the conservative Germans, is a water tank or reservoir, built under the wagon frame, from which the pumps take the water through suction pipes resting upon the bottom of the tank. The latter is intermittently supplied with water brought to it either in large casks on trucks or by means of a short hose, if a hydrant is within convenient reach. As yet the idea of connecting the pumps direct with a hydrant, and thereby affording a continuous supply of water with considerable initial pressure behind it, has not seemed to dawn upon their fire engineers. Some years ago, while at a fire in Vienna, where perhaps the greatest water supply system in the world exists, with a pressure of 75 pounds to the square inch, the writer remembers seeing several tenders, each consisting of a huge tun upon a four-wheeled truck drawn by two horses, running as fast as possible to and fro between a hydrant and a working engine which sucked its supply from an enormous tub or vat deposited on the ground beside it. A few seconds only were required to empty the tub, and a halt was called until more water should arrive. With a great commotion the cask-bearing truck pulled up beside the vat, a fireman, or properly speaking a waterman, deftly knocked out a huge bung or stopper, and with a gush the cask delivered its charge, and the engine was set to work for another minute to quench the fire.

Eating Ice.

The following thermodynamical problem is stated and solved by the Engineer: "A boy eats two ounces of ice. Let us see what is the approximately thermodynamic equivalent of the work he has made his interior do, assuming he takes five minutes to eat it. In melting the ice he will require 18 units to reduce it to water. To raise it in temperature to that of his inside he will require seven more units, or a total of 25 British thermal units. Taking the mechanical equivalent as 777 foot pounds, this will be equal to 19,425 foot pounds. If the boy weighs 100 pounds, he will have called upon his stomach to do as much heat work as would, with a machine having unit efficiency, raise him 194 feet high, or a rate of heat extraction equal to nearly an eighth of a horse power."

An Improved Automobile Steam Engine.

A new compound oscillating steam engine for automobiles is being perfected by Mr. Paul L. Crowe of this city. The improvements in this new engine consist in the reduction to a minimum of the number of bearings and other frictional surfaces; the use of very short ports, thus obtaining the minimum clearance; and the changeability of the engine from compound to simple or *vice versa*, by the simple manipulation of a valve. Engines of this type have been in successful operation for the past two or three years; and the inventor, in making some improvements to adapt it to steam carriages, has so constructed it as to make it readily adaptable to launches, hoisting outfits, or any other kind of work where a light, simple, and compact engine is desired.

Commissioner of Patents Allen will give a course of lectures during the winter on patent law and practice.