an angle steel frame, to which the body is also bolted, and from which it can be removed by taking out four bolts.

One of the vehicles was recently run from New York to Springfield without any difficulty at an average speed of fifteen miles an hour. The roads were very muddy, and two-thirds of the trip was made in a cold and driving rainstorm.

The wheel base is 5 feet 9 inches long, tread 54 inches, tires 30 by 3 inches on all four wheels; the rear axle is solid from hub to hub and made of nickel steel; the differential gear is in one of the rear hubs; heavy roller chain drive is employed; the mud guards are of leather, 10 inches broad; large ½-inch double ball-bearings are used on both front and rear axle; and the motor is equipped with variable jump spark ignition, employing eight cells of dry battery, four in use and four in reserve.

A little device has also been attached whereby the engine may be positively started by a quarter turn of the starting handle. The main seat is very broad and has a high, comfortable back with springs in both the cushion and back. The company is getting many orders for this new model, especially from men who have had a great deal of experience with all kinds of motor vehicles, and have placed their orders only after giving the machine many practical and difficult tests. The carriages are equipped with all the extras usually furnished, including mud guards, lamps, roller boot and odometer.

THE EMPEROR'S YACHT "METEOR III."

Among the many debts that Germany will owe to the present Emperor is that of his having practically introduced yachting, and established it as one of the national German sports. His present, most active interest in yachting may be said to date from the time of his purchase of the English cutter-yacht "Thistle" from the Glasgow syndicate which built her and sailed her unsuccessfully off Sandy Hook for the America Cup. The original "Meteor" was opposed by the Burgess sloop "Volunteer," and made about as poor a contest for the cup as any yacht that ever came over for it. Although not suited for championship honors, she was a beautifully constructed and stanch craft, and was sailed by the Emperor for many years in the earlier days of his yachting enthusiasm. His next yacht "Meteor II." was a composite steel and wood racing craft, which combined in herself the best features of "Britannia" and "Valkyrie III." She was very successful in her races and was an easy winner from everything she met on the other side of the water.

"Meteor III.," which was designed by Cary Smith & Barbey, of New York, is an improved and enlarged "Yampa"—the latter, a very successful schooner that was designed by Mr. Smith and spent a great deal of her time in European waters. The "Yampa" eventually passed into the hands of the German Emperor, and under the name of "Iduna" has figured largely in the foreign regattas. The Emperor was so well pleased with the "Iduna" that last fall he placed an order with these architects for the construction of a larger and faster yacht, which should embody the best features of the "Yampa," and have incorporated in her the valuable experience which they had gathered from the construction and performance of their later racing schooners "Amorita," "Elmina" and "Muriel."

The dimensions of "Meteor III." are as follows: Length over all, 161 feet; length on water-line, 120 feet; beam, 27 feet; draft, 15 feet; the least freeboard is 4 feet 6 inches; the taffrail is 6 feet 6 inches from the water-line, and the eagle at the figurehead is 11 feet from the water. The model differs not a little from the type for large, fast yachts which has been prevalent of late years. Thus, there is a slight hollow in the load water-line at the bow, and while the modeling of the hull shows the customary S section, the vessel is much fuller below the water-line and shows less of the flat floor than we have been used to in the later yachts, and compared with them she is a much more wholesome model. The line from the fore-foot to the stern-post is similar to those which characterize Mr. Cary Smith's designs, and the whole model is marked by the individuality which is seen in "Amorita" and the other racing schooners which have been so familiar in the races and annual cruises of the New York Yacht Club.

The frames and plating of the yacht are of steel; the former consisting of steel angles 2 by 3 inches; the keel is formed of a trough of steel, into which the lead ballast is run. In this respect she differs from the Herreshoff boats in which a lead bulb is cast separately and secured to the hull by bolting.

The accommodations of the yacht are, as would be expected from her great size, extremely commodious. Aft on the deck is a steel house from which a companion leads to a vestibule below, from which access is had aft to a ladies' cabin which extends the full width of the ship. From the vestibule a passageway leads forward, on the port side of which are staterooms for the use of the Emperor's staff, while on the starboard side of the passageway are the Emperor's private apartments; among these is a stateroom 13 feet square with a large bathroom adjoining. The main saloon, which is at the forward end of the passageway, is a splendid apartment 18 feet in length and extending the full 27 feet width of the yacht. It contains a piano, lounges, fireplace and a table which augurs well for the imperial hospitality, inasmuch as it will seat twenty-four persons. Just forward of the saloon is a kitchen 15 feet in length by 18 feet in width. On the port side of the kitchen are staterooms for the cooks and stewards. Forward of the kitchen is the crew's galley, a stateroom for the captain and one for the mate and boatswain. Then follows a steel bulkhead, beyond which is the forecastle for the crew, which contains twenty-four bunks.

In designing the sail plan the yacht has been given sufficient canvas to insure her combining the requirements of a comfortable cruiser with those of a fast racing yacht, her total sail plan being a little under 12,000 square feet, which is not so much as that carried by the "Columbia" by 1,000 feet, and is about 2,000 feet less than that carried by "Shamrock II."—but they, of course, were out-and-out racing craft. The mainmast, which is 21 inches in diameter, measures from deck to cap 89 feet. The main topmast is 60 feet over all; 17 feet of which are in the doublings, making the total height from deck to truck 132 feet. The main boom is 82 feet over all. The foremast, which is 20 inches in diameter, measures 84 feet from deck to cap. The foretopmast is 55 feet over all, with 16 feet in the doublings, the total height from deck to truck being 123 feet. The fore-boom is 36 feet in length. The base line measured from the end of the main boom to a point half-way between the jib stay and the jib topsail stay is 192 feet. The bowsprit reaches 24 feet outboard. The main-gaff is 48 feet long, and the fore-gaff 36 feet long. The club topsail spars are 52 feet and 41 feet long. When the club topsail is set the head of the sail may be 150 feet above the water. The career of "Meteor III." will be watched with great interest, and there is no doubt that in the hands of such an ardent yachtsman as the Emperor she will be a constant competitor throughout the yachting season in European waters.

In point of size "Meteor III." should be compared with "Gleniffer," which previous to the launching of the Kaiser's yacht was the largest fore-and-aft schooner in the world. As it is "Meteor III." is slightly the larger vessel. "Gleniffer" is 157 feet over all, 26 feet 7 inches beam, and 18 feet 3 inches in depth. "Meteor III." is, therefore, 4 feet longer, 5 inches broader and 1 foot 3 inches deeper.

In placing the order for his last and finest yacht with an American firm the Kaiser paid a distinct tribute to the skill of our designers and builders in the construction of large cruising and racing schooners. The American schooner is as historically famous as the English cutter, and in proof of this one has only to call to mind such names as "America," "Sappho," "Henrietta," "Dauntless," and the more modern "Yampa," "Amorita" and "Colonia."

The Kaiser has tactfully requested the President's daughter to christen his new craft, and the occasion is to be rendered doubly famous by the presence of Prince Henry. The double-page supplement showing the great schooner as she will appear under full sail will have a timely interest for our readers.

GASOLINE AUTOMOBILES—1902 MODELS.

The Haynes-Apperson Two-Passenger Runabout.

The two-passenger runabout, 1902 model, shown by the Haynes-Apperson Company at the Chicago Exposition will embody the latest improvements incorporated in their machines. These include direct gearing, water circulation by means of a radiator and pump, a new design of steel wheel rims of greater strength than used in earlier machines, and improvements in the carbureter, clutch and a new pump feed lubricator. The motor is a double-cylinder engine with cylinders arranged horizontally on opposite sides of the shaft—an arrangement that gets rid of troublesome vibration. The sparking device is of the make and break positive contact type, which the company claim is not affected by wet weather and muddy roads. The particular model shown weighs 1,250 pounds; the motor is of 6 horse power, wheels are 32 inches in diameter, and the carriage is handsomely finished with leather upholstery. The machine has three speeds forward and one reversed, all controlled by a single lever. The Haynes-Apperson people entered two machines in the New York and Buffalo endurance contest, and they finished second and third out of a field of 89 that started. All of the Haynes-Apperson carriages are fitted with wood wheels, which the company claim to have found equal to the most exacting requirements of the road. A feature on which much emphasis is laid is the fact that they are larger in diameter than those customarily in use, and that consequently there is considerably less jar in traveling over rough roads than there would be with smaller wheels.

The Gasmobile Stanhope.

The Gasmobile embodies all the features of the best French machines, and the motor and machinery are so situated that they can easily be inspected.

The 25 h. p. four-cylinder engine of the Gasmobile stanhope, vertically disposed within the framework of the car, produces, when in motion, but a slightly perceptible vibration. The system of lubrication is most thoroughly carried out. Besides a small quantity of oil in the crank-case, automatic oiling devices are also provided. The water circulation is established by a rotary force pump. Both the inlet and exhaust valves are thoroughly water-jacketed. The Gasmobile vaporizer is highly efficient, simple in construction and never-failing. Its throttling feature, together with the quickly adjustable timing of the sparking device, make it possible to vary the speed of the motor over a range more than ample to secure the greatest variation in speeds desirable. Gasmobile engines are readily started notwithstanding their high compression. They are not, strictly speaking, high-speed motors. They are of slightly greater weight and larger proportions than other so-called high-speed motors, and therefore while quite as powerful as the latter, are more durable, since they do not run so fast.

The expanding friction clutch, which transmits the power from the motor to the driving-gear, ranks high among devices employed for this purpose. It is positive and substantial and will take hold of the clutch casing attached to the flywheel gradually, thus causing the car to start smoothly and without jerks.

At the right of the chauffeur three levers, forged from tough steel and operating on a double notched sector, serve for starting, stopping and reversing, and changing from the first to the fourth speed, as well as for operating the main brake.

The Gasmobile stanhope has a 71-inch wheel base and the regular standard tread of 56½ inches. All four wheels are 32 inches in diameter, and fitted with clincher tires. Three forward speeds and one reverse are furnished, and the 12 horse power motor will drive the machine as high as 30 miles an hour.

The Fischer Gasoline-Electric Omnibus.

The Fischer Motor Vehicle Company have for the past five years been perfecting a combination system, which possesses all the good qualities of the electric and gasoline combined, while the disadvantages inherent in each alone are practically eliminated by the combination.

The system consists of a combined gasoline engine and dynamo, one motor for each (rear) drive wheel, and small storage battery and controller. It will be noticed that there is no mechanical connection between the engine shaft and vehicle drive wheels, therefore the dynamo is free to run at a practically even speed, producing a constant supply of electricity. The electric circuit is so arranged that when running the vehicle under normal conditions (loaded on the level) the current goes directly from the dynamo (through the controller) to the motors; but when coasting down grade, slowing up or in general when less power is needed than that furnished by the engine, the current is automatically taken up by the battery, which is connected to the wiring at a point between the dynamo and controller. Again, when extra power is needed, as in ascending steep grades or starting heavy loads, the battery promptly furnishes the deficiency. This action—the carrying the peak of the load—does not have to be watched by the operator, being entirely automatic. As the output of the engine does not vary, no governor is required, and the gas and air mixtures can be set permanently for perfect combustion. This insures great saving in fuel and prevents the usual bad odor. As the speed of the engine is almost constant, the balance is nearly perfect, thus preventing vibrations. Another very important and convenient feature is the starting of the engine, which is accomplished by simply throwing in a switch controlled by the driver.

Fig. 1 shows an 18-passenger omnibus recently completed. Fig. 2 is a photograph of one of the standard running gears, which consists of an angle steel underframe to which various parts of the machine are attached. The front portion carries the gasoline engine, dynamo, controller, and steering gear. The front axle, instead of being made of the usual heavy forging, is trussed somewhat on the principle of a bridge, and carries extra long and flexible platform springs, bolted to the brackets on the frame. The rear axle with the wheels, springs, two motors and reduction gears forms a complete driving unit. All parts subject to wear are entirely incased so as to be properly lubricated and at the same time protected against dust and moisture. No reach is used, the half-elliptic springs conveying the power from the rear axle to the frame. The water cooler is suspended under the frame between the front and rear axle. The illustration, Fig. 2, shows the running gear complete in every respect, and Fig. 3 the body in place, making a finished bus.

The power equipment consists of a 10 horse power,

3-cylinder, 4-cycle gasoline engine running 600 revolutions per minute. Directly on the engine shaft is placed the armature of a 5-kilowatt 110-volt dynamo. The motors are of special "twin" type (built together), 5 horse power each, and will stand an overload of 100 per cent for a half hour, or 200 per cent for 5 minutes without sparking at brushing. The controller is of the series parallel type of five forward speeds of from 2½ to 10 miles per hour, and two reverse speeds of 2½ and 5 miles per hour, all controlled from one lever. The batteries consist of 50 cells of 90 ampere hours' capacity. The front wheels are 38 inches in diameter and the rear 46, all equipped with 4-inch Calumet solid rubber tires.

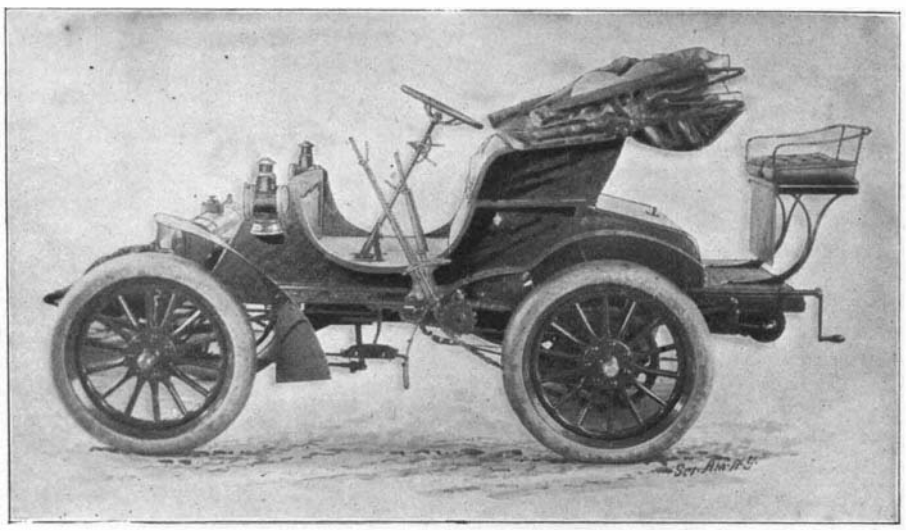
In a test recently made of this bus by one of New York's largest automobile corporations, it developed that the bus not only made its scheduled time during a snowstorm, but that the heating apparatus kept the inside comfortable while the weather was below freezing point. The total mileage made by the bus on this day was 54, the engine using 12½ gallons of gasoline, same costing 9 cents per gallon, making the cost of fuel a fraction over 2 cents per mile, and this under the very worst conditions that an automobile could be asked to work under—snow.

The company has orders for a number of heavy trucks, some of them being of the beer truck type, built to haul seven tons.

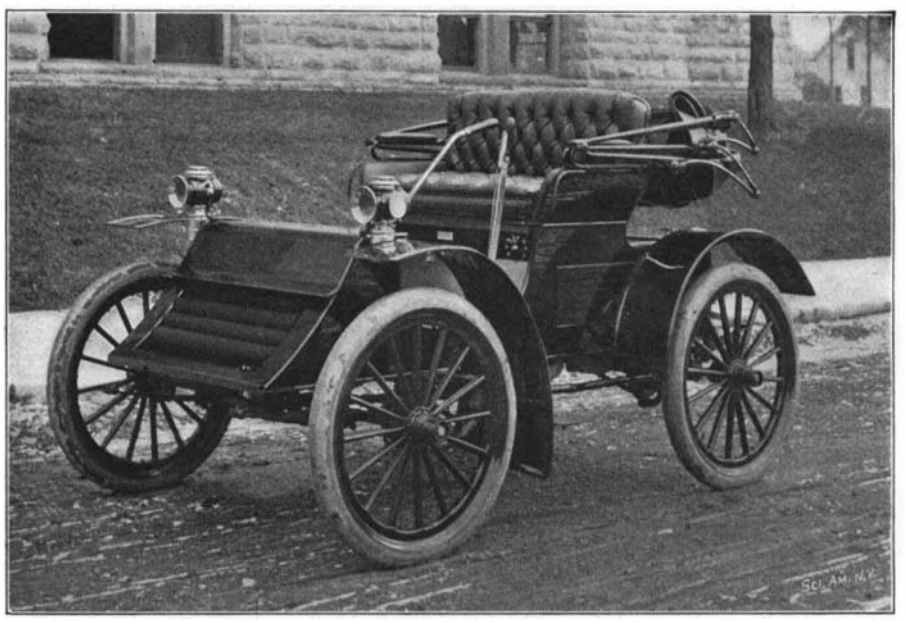
Peerless Touring Car.

The Peerless motor car has a long wheel base and low center of gravity, with motor situated in front. The frame is built of channel iron after the style of a locomotive, thus carrying out the idea that the motor car is a road locomotive rather than a horseless carriage. Both front and rear wheels are pitched inward, after the manner so long in use with all vehicles not run on prepared tracks. The pitch of the rear wheels is made possible by the flexible driving axle, which also obviates all loss of power by excessive friction when strains of the road tend to throw the rear wheels out of alignment.

The motor consists of two vertical 4 x 4⅜ inch cylinders, with cranks inclosed in tight aluminium cases and running in oil, an arrangement which automatically lubricates the cylinders and all bearings. Owing

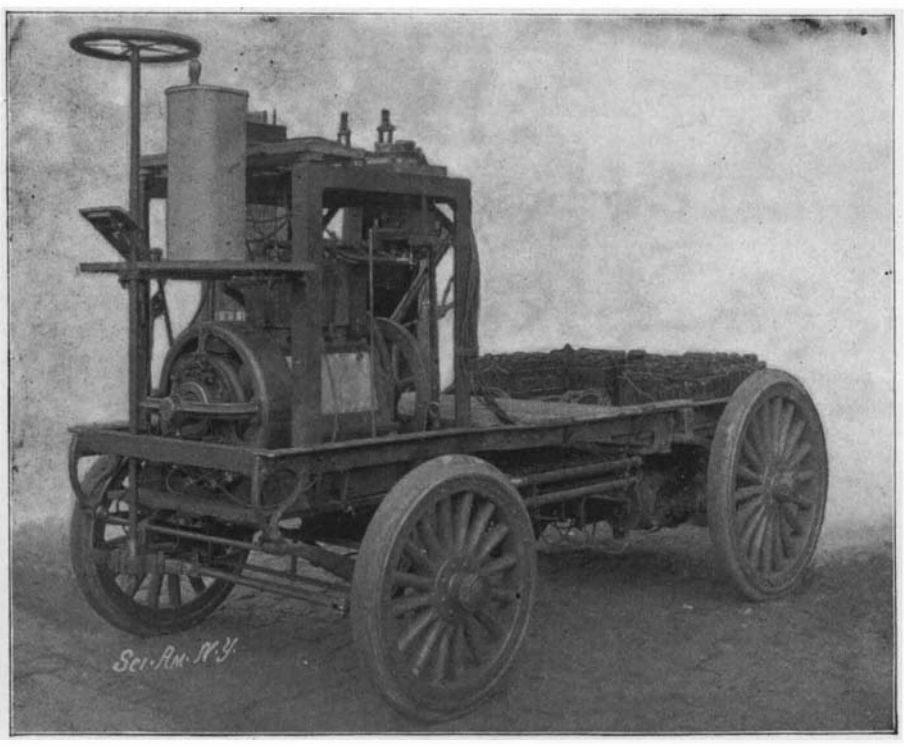


The Gasmobile Stanhope.



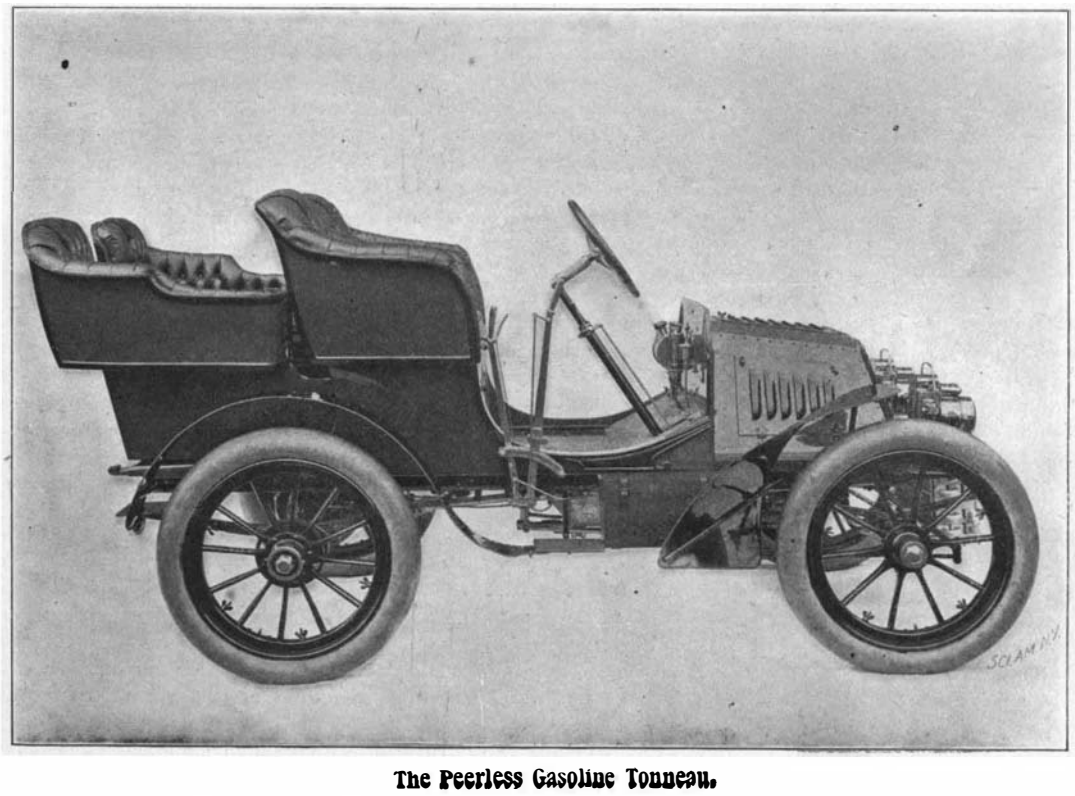
The Haynes-Apperson Gasoline Runabout.

The Fischer Gasoline-Electric Bus.



The Fischer Bus With Body Removed.

Front View of Peerless Touring Car.



The Peerless Gasoline Tonneau.

GASOLINE AUTOMOBILES—1902 MODELS.

to the vertical position of the cylinder it is thoroughly lubricated, since the piston rings wipe uniformly the entire circumference, and thus prevent any oil getting into the firing chamber, which does away with obnoxious odors and keeps the spark plugs clean. Both grease cups and force feed lubricators are used throughout the machine, and all are situated on the dashboard before the driver. The mufflers used produce very little back pressure and yet almost eliminate the noise of the exhaust.

Ignition is by the jump spark system, the make and break of the circuit being accomplished by means of a mechanically operated vibrator of unique and entirely original design, which requires no adjustment for months. Heavy insulated cable is used in all the wiring.

A circulation of water through all the engine jackets is obtained by means of a centrifugal pump operated by a friction disk against the flywheel. The water is pumped through a very effective system of radiating coils at the front of the car, and only two or three gallons are used.

An atomizing float feed carbureter of improved design, requiring absolutely no adjustment to the varying speeds of the motor, is used to furnish gas for the latter. The motor is started by a half turn of the crank, which is placed at the front of the car. The speed gear is connected with the driving gear by a flexible shaft and with the motor by a universal coupling, which protects the bearings, gears, and clutch from any strain due to an inequality of the road. The gears are inclosed in an aluminium case and run in an oil bath which automatically lubricates all bearings. The speed changes are obtained by means of a single lever at the right, which gives three speeds forward and one reverse, while the speed of the motor is regulated by varying the time of the spark.

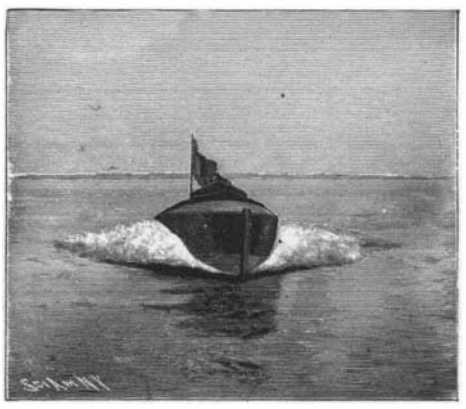
The changes of speed are made by friction clutches that go in without clatter or vibration, and the gears operate without noise. A powerful band brake on each rear wheel is operated by a lever at the right and held by a ratchet until released. A foot brake operates on a drum on the change gear shaft between the motor and the compensating gear.

All two-passenger cars have a rear platform which may be used for luggage, rumble seat, or two-passenger tonneau. The driver's seat is either double or divided into individual seats. The cars are geared to make 30 miles an hour at a speed of 1,200 R. P. M. of the engine, but are capable of being speeded up to 40 miles an hour. They are equipped with two kerosene side-lights and a very powerful acetylene headlight, or with two side-lights and two acetylene headlights having a combined power about equal to the single headlight which is offered as an option. The mudguards are of aluminium with front guards flared out, protecting both occupants and the car from mud when the wheels are at an angle.

HIGH-SPEED TWIN-SCREW YACHT "VIXEN."

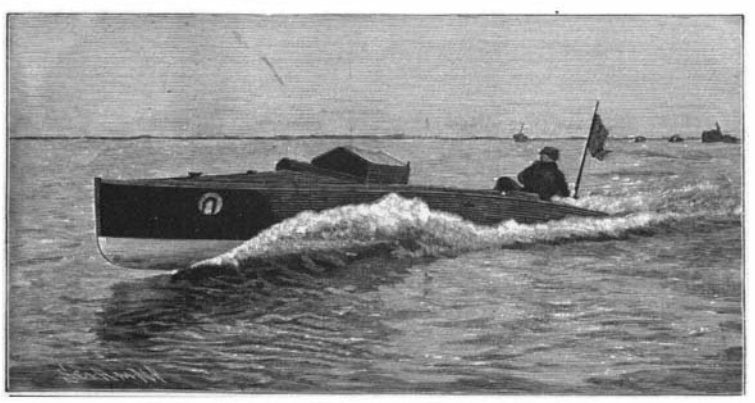
There are few cities in the world that are so advantageously situated as New York city for the running of a system of suburban transportation by water, and we venture to think there is no city where these natural advantages are so little taken advantage of. It is true there has been some talk recently of running a line of high-speed passenger steamers between New York city and suburban towns on the Hudson River, which was to be capable of making a speed of 30 knots an hour, and competing with the railroad service; but the scheme seems to be in abeyance, if it has not altogether fallen through. Practically the only travel of this kind that is done is due to the owners of private yachts, many of whom make the journey every day by water between their residences on the Hudson and along the Sound and New York city. The convenience and pleasure of this method of travel are obvious.

We present illustrations of a high-speed yacht which has been built by the Gas Engine and Power Company, Morris Heights, New York, for Mr. Archbold, who will make use of it principally for the run between his home in Tarrytown and his business in New York city. The dimensions of the vessel are: Length over all 100 feet, load waterline length 96 feet, beam 12 feet, and draft 4 feet. The "Vixen" has been modeled for high speed, and she has the fineness and sweetness of lines which are seen on the fast torpedo craft. The framing and planking are of wood, the boat being double-planked and copper fastened; the sheer strake, deck stringers, floors and keelsons are of steel, as are also the bulkheads. The vessel is driven by twin-screw engines which, when running at a speed of 450 revolutions per minute, will, together, indicate 500 horse power. The guaranteed speed is 20 miles per hour, and the builders expect to get between 21 and 22 knots an hour on the trial trip.



BOW VIEW.

A steel trunk-house extends for about two-thirds of the length of the vessel amidships, and forward of this is a deck-house or pilot-house of red mahogany, paneled, which will be utilized as a dining room, for which purpose it can accommodate six persons. Immediately abaft of this structure comes the trunk-house, which extends from the deck-house to the after end of the owner's quarters. The accommodations below deck are as follows: In the forecastle are the quarters for the crew. Aft of these is a large galley in which a dinner can be prepared and served by connection to the dining saloon above. Abaft of the galley are the boiler room and coal bunkers. Then follows the engine room, and aft of this is a large stateroom for the owner, which extends to the full beam of the vessel and is fitted with two berths, a dresser, lockers, etc., and has a toilet adjoining. Aft of this, again, is a large saloon. The stateroom and saloon are finished in white enamel and gold.

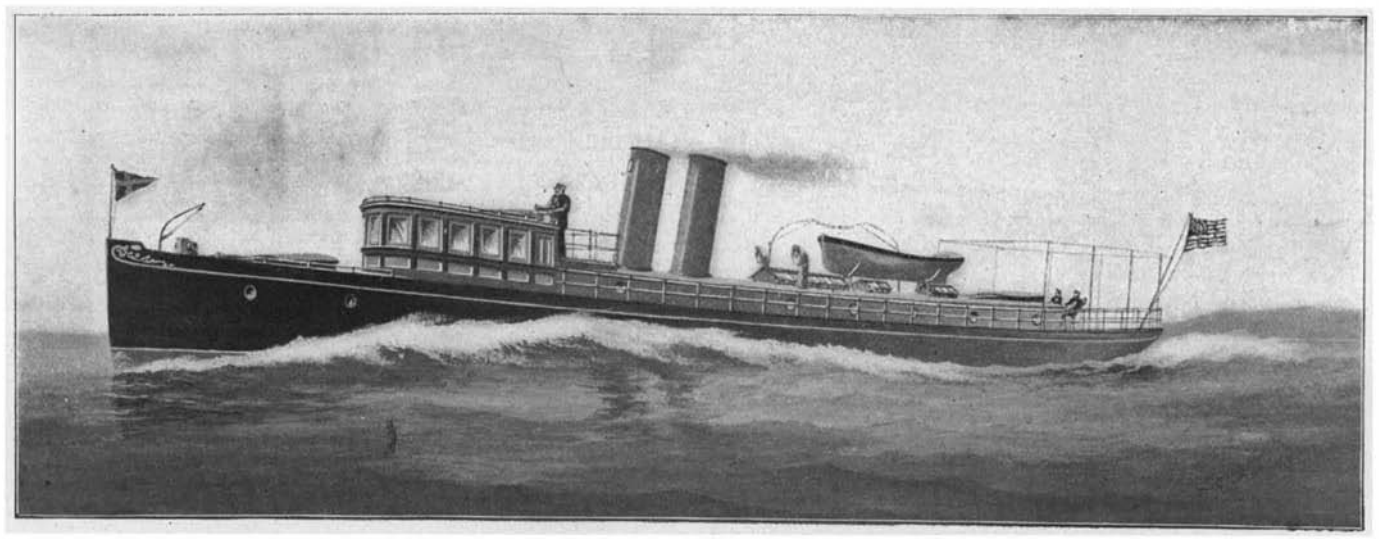


Length, 39 feet 3 inches. Beam, 4 feet 3 inches. Horse power, 25.

"ROLLO" AT EIGHTEEN KNOTS AN HOUR.

The motive power is of what might be called the torpedo-boat type; that is to say, it consists of water-tube boilers and triple-expansion, fast-running engines. The object aimed at in the motive power is the reduction of dead weight by securing a high average indicated horse power per pound of weight. The boilers are of the well-known Seabury safety water-tube type. Particular attention is given in the design to the circulation of water. By using the outer water-tubes for returning the water to the bottom of the boiler a much larger area is secured for the return water than could be obtained by using large return pipes. The furnace is surrounded by water-tubes that have the same opening between them as the diameter of the tubes, and ample room is thus left for the gases to pass freely among all the tubes for their entire length. The firebrick baffle-plate between the tubes above the furnace absorbs a part of the heat when the fire is very hot, which is given off again when fresh fuel is put in the furnace, a certain amount of reverberatory effect being thus secured. There are a series of horizontal tubes on each side of the steam drum for the purpose of superheating the steam. The triple-expansion engines have cylinders 7 inches, 11¼ inches and 17½ inches diameter by 10 inches stroke. Care has been taken to remove all superfluous metal from the revolving parts, and it is thus possible to secure a high rotative speed with a minimum of vibration.

The yacht is finished with a stern of the torpedo-boat type; and with her twin funnels, low trunk, and single deck-house forward, she has a decidedly smart and rakish appearance.



Length, 100 feet. Beam, 12 feet. Speed, 20 knots.

NEW HIGH-SPEED TWIN-SCREW YACHT "VIXEN," NOW BEING BUILT FOR MR. ARCHBOLD.

THE MARINE AUTOMOBILE.

THE RECENT FRENCH INVENTION OF THE AUTOMOBILE LAUNCH.

Automobiling on water has now become an accomplished fact. French engineering skill has turned the features common to the racing automobile into use for propelling the long, slim body of the automobile launch through the water at a furious rate of speed. The machinery is the same as in a high-power automobile, the manner of transmitting power is the same, the fuel, the motive power and the manipulating devices are practically identical. The only actual differences are that the motive power instead of being carried on wheels is incased in a smooth wooden canoe skin, offering a minimum of resistance to the water, and that the device steers by rudder instead of by mechanism acting on the front axle. In all other essential respects the automobile launch and the automobile carriage are virtually alike. A competent chauffeur can handle either type, and it would not be impossible to build a motor vehicle out of the machine parts belonging to a motor launch—so closely identified are these otherwise apparently dissimilar means of travel.

It is quite natural that the sport of automobile launch racing should receive its baptism in France, the native home of automobilism, for the French, though poor at yachting as a nation, enjoy a well-merited reputation in the line of light craft for pleasure boating.

The motor as well as the hull herewith shown were specially designed for racing, and it was found that the motor worked perfectly under all conditions, starting with a half turn of the handle and maintaining its speed smoothly and regularly. The type of motor adopted was that made famous by the Panhard & Levassor establishment, makers of the Panhard automobiles. The superintendent of the factory, M. Krebs, selected a 24 horse power gasoline motor and made some minor changes in it to fit the marine equipment of the launch. After considerable experimenting it was found that the motor under favoring circumstances actually developed more horse power than its indicated rating, and then the idea of racing this new and strangely unfamiliar craft occurred to M. Giraud. He applied to the Helix Club of France for a series of trials over measured distances of salt water, entering his craft under the name of "Rollo"—an automobile canoe measuring 39 feet 3 inches in length, with a beam of 4 feet 3 inches and 24 indicated horse power. The first race took place at a course near Argenteuil, in which "Rollo" was entered among a number of high-power launches of her class. She finished a winner of the 24-kilometer (14.90 statute miles) course in 1 h. 17 m. 31 s., a speed of 11.53 statute miles. In a subsequent race at the Cercle de la Voile de Paris at Meulan the course was 52 kilometers (32.30 miles) and