BUILDING A MOTOR INTRICATE PROCESS

Designer Must Ever Keep in His Mind's Eye the Picture of Finished Product

"Motor car building is peculiar in one way," states Elwood Haynes inventer and builder of America's First Car and president of The Haynes Automobile Company, Kokomo, Indiana. "While it is necessary to start with practically nothing and build up a finished car, there must always rest before the eye of the inventor and builder a picture of just exactly reverse conditions. He must see first the finished car in the hands of an owner; he must see that owner starting his car—driving it—caring for it; and he must be guided by that mental picture in the selection and specification of his car in order that the owner may drive it with the greatest possible comfort and convenience and at the same time receive a sincere and faithful service from its performance.

"In the design of the car every part and unit of the construction must be carefully and painstakingly thought out. The motto of the engineering department should be, 'Do the experimenting on paper' absolutely nothing should be built until it has been carefully calculated and laid out to scale on paper.

"First, the motor is drawn up on a rough layout drawing, then with this preliminary drawing as a guide the cylinders, crankcase and other important parts are next drawn in detail. Even the most minute parts, such as a lock washer or bolt, must be drawn up on individual sheets in order that a clear record may be kept not only for the purchasing department but to facilitate the handling of repair business for years to come to insure efficient service.

"When every detail has been carefully designed, the motor is redrawn with all fittings and accessories attached. In this manner it is possible to foresee any interference or constructional difficulty, for as a matter of fact, the skilled draftsman can see the finished motor on the drawing before him.

"With the motor drawings completed, the next problem is to design the frame and other chassis parts. The chassis design must be harmonious with the design of the power plant; the motor must be suspended in such a manner as to relieve it from all road shocks in order that it may at all times deliver all its power to the rear wheels. The car as a whole must be well balanced, in order that skidding and the resultant wear on tires may be reduced to a minimum. The design must be based throughout on sound engineering principles, and yet at the same time every part and unit should be carefully considered from the standpoint of the owner, making the car particularly well suited to those who prefer to care for their own machine."

Having driven one of the new Dodge Brothers' cars over 532 miles of rough Texas roads, Fred A. Grayum, dealer at Snyder, Texas, has returned with an enthusiastic report of his trip. "We traveled over steep hills and rocky ridges for a good part of the trip and found people eager to inspect the new car at every town," writes Mr. Grayum. "All parts of the car are in fine working order, and the longer the car worked out, the better it rode. Texas motorists say it's the best value on the market."

MAXWELL RACERS WIN GREAT VICTORY

Barney Oldfield and Billy Carlson Win First and Second at Venice Grand Prix Race

Before a mammoth crowd at the greatest race of the season the Venice Grand Prix, the western classic race that takes the place of the old Santa Monica, the Maxwell cars of Barney Oldfield and Billy Carlson created a new precedent in American automobile racing by winning first and second places.

In this, one of the most remarkable speed contests seen in recent racing events, with over a score of the best American and foreign cars, entered, and with five of the world's most daring pilots in line to win until the last mile, Barney Oldfield, "World's Master Driver" in a speedy Maxwell racer won first place, and made the hard grind of over 300 miles without a single stop, or change of gears, at an average speed of 68½ miles per hour. Time: 4 hours, 24 minutes, 9 2-5 seconds.

"Sure Finish" Billy Carlson, teammate of Oldfield, drove his Maxwell, winning second place and with but one short stop of 7 seconds to his credit. His time was 4 hours, 24 minutes 43.3 seconds.

Ruckstell in a Mercer won third bacs with time of 4 hours, 27 minutes, 27 seconds and John Marquis in a Buggetti finished fourth.

Oldfield's Second Nonstop

The time made by Oldfield and Carlson was 10 miles an hour faster than the Grand Prize and nearly 2 miles faster than that of the Vanderbilt. For the second time in a few months, Oldfield established a nonstop record, equalling his performance with the Maxwell at Carona, Thanksgiving Day, when he drove 300 miles without a single stop and made a new world's nonstop record.

Carlson, the second pilot on the Maxwell team, crossed the line less than half a minute behind Oldfield. But for his short stop for oil he might have added the fourth 300 mile nonstop record to the long list of Maxwell achievements. At San Diego but a few weeks ago he drove his car 305 miles without a stop and won second place.

This latest victory was as much a tribute to Maxwell consistency and efficiency as to the Maxwell speed, and spoke volumes for superior construction as well as wonderful driving.

Original Oldsmobile in Smithsonian Institution

Probably the best known historic object connected with the automobile industry, the original model Oldsmobile which was constructed several years before the earliest types of motor carriages made their appearance, has been presented by the Olds Motor Works to the Smithsonian Institution and was relinquished to the National Museum in January.

This car is commonly looked upon as being the grandsire of the motor car business. It was designed and built, or laboriously hammered and moulded out of metals in Lansing, Michigan in 1894 and 1895. About the aged relic is woven the romance of more than a quarter of a century of struggles, tragedies and successes which marked the formative period of this great industry. Plans laid as far back as 1885 for building the vehicle, which originally was to have been propelled by steam, but did not materialize until the Spring of 1894, and experience during this lapse of time proved to the builders the efficiency of the gasoline motor.

Among those who helped to build the ancient car are workmen who are employed in the Oldsmobile factories and they tell many interesting stories of the adverse conditions which were met, and because of which two years were required to bring it to a state of completion. Several years were spent in testing it during which it was often espied on the roadways and became a familiar sight to most of the inhabitants of Southern Michigan. Subsequently it served as a working model for the first curved dash Oldsmobile runabout.

It has traveled by railroad to different parts of the country to be exhibited at automobile shows, fairs and expositions, and always has been faithfully kept in a sound state by the original makers because of its historic value. It is cherished by the residents of Lansing, Michigan, because the commercial prosperity of the city dated from the building of the car. When placed on public exhibition in Lansing in the month of November it attracted great crowds.

In appearance it presents a strange combination of the horse drawn and power driven vehicle. So closely does it resemble the former that it might easily be mistaken for one of the old style trap carriages in vogue some twenty years ago, were it not for the absence of shafts and a whipsocket. The dash board usually associated with horse drawn vehicles was not omitted by the designers and thirty-six inch wooden wheels with solid rubber carriage tires are another odd feature of the equipage. The steering apparatus consists of a joined hand lever somewhat similar to the steering levers on some of the earliest types of motor cars. A crank at the driver's right operates the gear shift and clutch release. The motor is a one cylinder gasoline engine and a considerable number of its parts are almost identical with the stationery engine of that day. A gasoline tank with a capacity of ten gallons is located under the rear seat.

In all it is estimated that the vehicle has been driven some 20,000 miles. Perhaps the most remarkable thing about the car is the fact that it is still capable of being run, and at a fair rate of speed, although built almost a generation ago.

Expensive Equipment For Testing Hupmobiles

In line with the policy of maintaining only the best equipment for producing Hupmobiles, the Hupp Motor Car Company has recently made a large addition to their factory in the form of a dynamometer test department.

"The dynamometer test," said Mr. S. H. Humphrey, Manufacturing Manager,—"Is a mechanical apparatus used for testing automobiles under all conditions of road work. Formerly our method of testing, as is the practice in most motor companies, was to turn the chassis over to a "tester," to drive it around in any shape or manner that he sees fit. Now in a test of this kind, where the car is turned over to a mechanic, the personal element of the driver enters very strongly into the results obtained. For instance, a certain car that one mechanic may say is in perfect shape, might be turned down by another man. You can plainly see where matters of this kind are left to one's own judgment, there will be a difference of opinion between the employes.

"With the dynamometer, the exact opposite is the case. Each motor and chassis is tested under the eye of an expert. Electric charts on the dynamometer switch board accurately show the exact conditions under which a car is working. At the will of the operator, the machine can be taken off a smooth asphalt road, and made to run under the worst sort of sand and mud road conditions; or the car can be made to climb a hill. In this dynamometer test, we get an accurate reading of the actual horsepower that each motor develops, and every car that is turned out must absolutely be up to a given standard, which is impossible to obtain under any other method.

"Other very important reasons why the dynamometer is more efficient and accurate than the former methods of testing, are the facts that the new apparatus relieves the company of the reliability of having testers on the streets; we know that the machines are being actually tested, and we know that the mechanical test is accurate to a degree which would be impossible under the hands of a mechanic.

"The new installation cost the company over $75,000.00, and it is similar to that which is used by manufacturers of the leading high-class cars. It is just another reason why we believe the Hupmobile is the best car of its class in the world."

Valves on Buick Have Been Greatly Improved

The Rich tungsten valve, which has been adopted for the 1915 Buick motors, is made of an alloy of tungsten and steel, commonly spoken of as tungsten steel. This alloy is the typical example of the "high speed steels" now widely used in rapid metal cutting operations and its remarkable qualities are the basis of its special adaption to use in the poppet valves of internal combustion motors.

The most marked characteristic of tungsten steel is the fact that when it is red hot its strength or stiffness to resist deformation or bending is not materially altered over that which it has in its cold state. This is readily illustrated by the fact that a lathe tool of tungsten steel used in such work as taking heavy cuts from large, touch steel forgings, such as naval guns, or similar articles, attains a temperature which brings the tool to a bright red color at the cutting edge, due to the friction generated by the rapid removal of the metal, and yet at this temperature the tool retains its stiffness and sharp cutting edge for long periods.

In using valves made of ordinary material with electric welded stems or of cast iron heads on steel stems failure of the steam just under the head often occurs, due to the welding having been overheated in welding or in fusing the cast iron onto the steel. This does not occur in Rich tungsten valves, because they are always made in one piece, and never welded.

If valves can be run for long periods without grinding, the surface of the cast iron cylinder seat as well as the seating surface of the valve becomes exceedingly hard and dense, and this adds greatly to its wear and heat resisting qualities. When ordinary cast iron or steel valves are used, frequent grinding is necessary, and one no sooner gets a suitable surface as far as hardness and denseness is concerned than it has to be removed by grinding because of valve leakages. With tungsten valves a surface is obtained once and kept for extremely long periods.