

METAMORPHOSIS of the MODEL T FORD

By John "Pete" Schmauch

When the first Model T Ford automobiles appeared on the scene they were just plain, fairly dependable transportation units, devoid of any frills or fancy details.

Henry knew what the public wanted and he supplied it to them. This was the answer to low cost transportation for the masses - the Model T Ford.

As we all know, the first Model T appeared in late 1908. In the following years, many of the T's were 'improved, mostly by "back-yard mechanics. Cylinder heads were shaved, giving higher compression. Larger valves were installed. Special carburetors were added. As the knowledge of how to pep them up spread, it became a national game to see just how much the Model T could be improved in performance.

At the same time, improvements were made in their appearance. Changes were made to the bodies to make them more appealing to their owners. It wasn't long before complete bodies, of many styles, appeared that could be fitted to the Model T chassis. Now, with a pepped-up engine and an attractive body, the Model T lost its awkward look and many of them were more than a match for automobiles which cost many times more than the Ford.

In many localities there was more than one back-yard mechanic. Each thought his improved T was better than any other. Rivalry developed and, as the weekends came, sometimes there was a race between two or more souped-up T's and other cars. More often than not, the T's were victorious and this delighted other T-owners who, in turn, tried to get more power and speed from their cars. Races were held, the courses being between towns, and the rivalry developed between owners of Fords in various localities. As this rivalry grew more intense, the limit to which stock Model T's could be souped up came to a point where further improvement was next to impossible.

In or about 1915 an enterprising man, C. D. Noonan, of Paris, Illinois, designed, built and introduced to the owners of T Fords, an overhead valve set-up. This was an eight valve head. About 1916 there appeared the first

This article, revised and updated from its original version published in The Vintage Ford, Volume 3, Number 1 (1968) is reprinted for the enjoyment of the several-thousand members who have joined since that time.

John "Pete" Schmauch, author of this article, is the founder of the "Fronty-Ford Club, a group devoted to early Model T Ford racing in general, and to Fronty-Fords in particular. Readers who might be interested in joining this club are invited to write to "Fronty Pete" at 45 Greenwood St., Tamaqua, PA 18252.

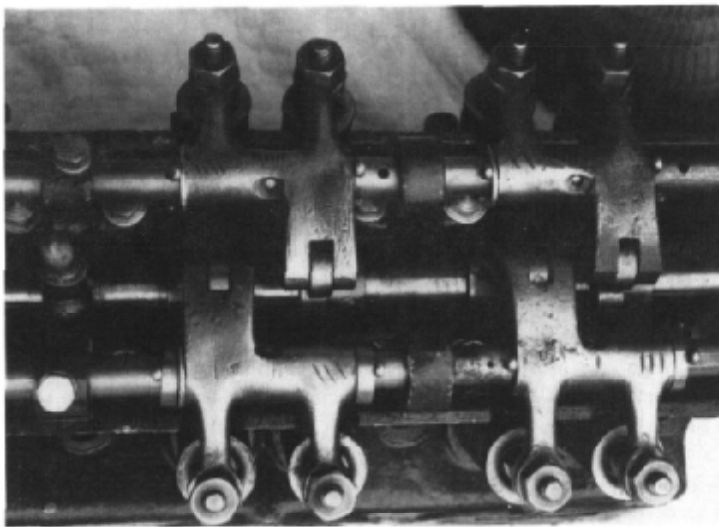
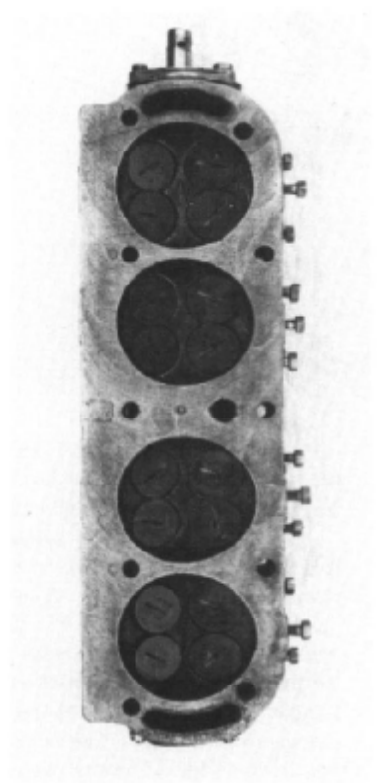
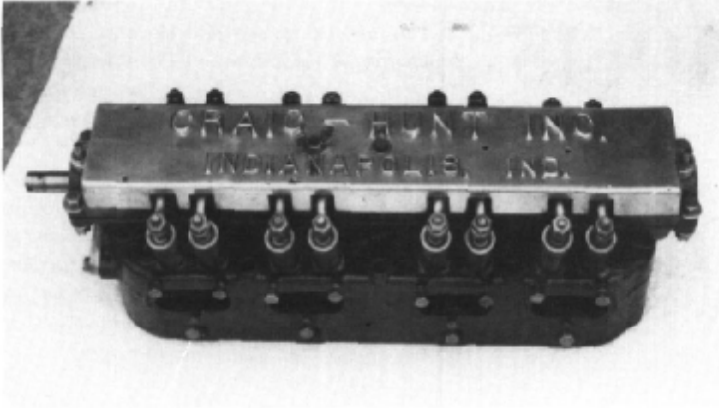
single overhead camshaft cylinder head for the Ford and this was a sixteen valve set-up, featuring four valves per cylinder, similar to the Peugeot racing engine. This head was a beautiful piece of workmanship and a Ford equipped with one of these Craig-Hunt heads could really go - as long as they held together. One of the bad features of this unit was the fact that the lobes for the single camshaft were not integral with the cam shaft. Instead they were to be placed where each individual owner thought they would give the best performance, and then pinned in place. As you can imagine, this produced some pretty negative results, as few owners knew just how to set them for best results. In addition they had a habit of coming loose after a little use.

The following year these Craig-Hunt units came out with a camshaft in which the lobes were an integral part of the shaft. The Craig-Hunt equipment was manufactured in Indianapolis, Indiana.

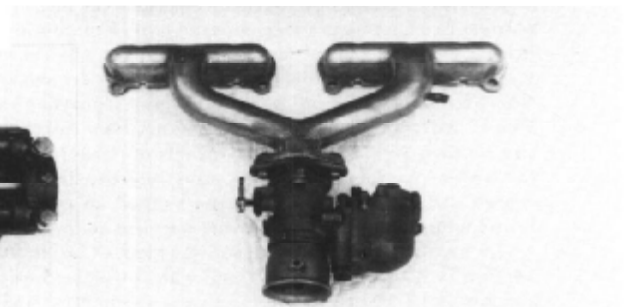
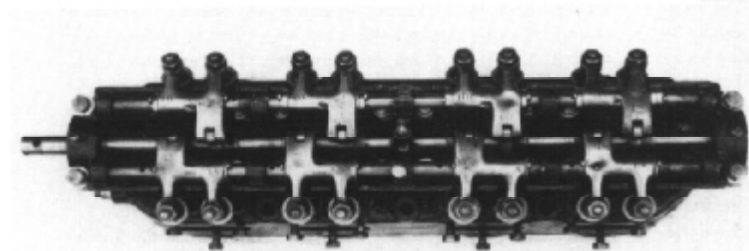
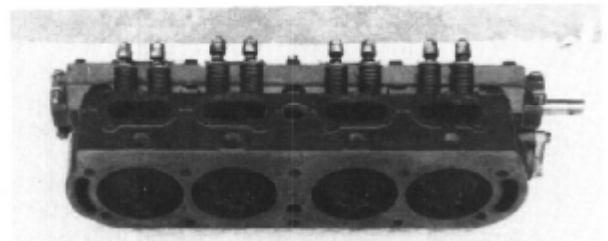
About 1917, Robert M. Roof, of Anderson, Indiana, an engineer, introduced a sixteen-valve rocker arm head for the T engine. A year later the Roof head was featuring a greatly improved model - the first ones were very troublesome. These heads used eight pushrods for the sixteen valves, each pushrod actuating a forked rocker arm which in turn opened the two intake or two exhaust valves in each cylinder.

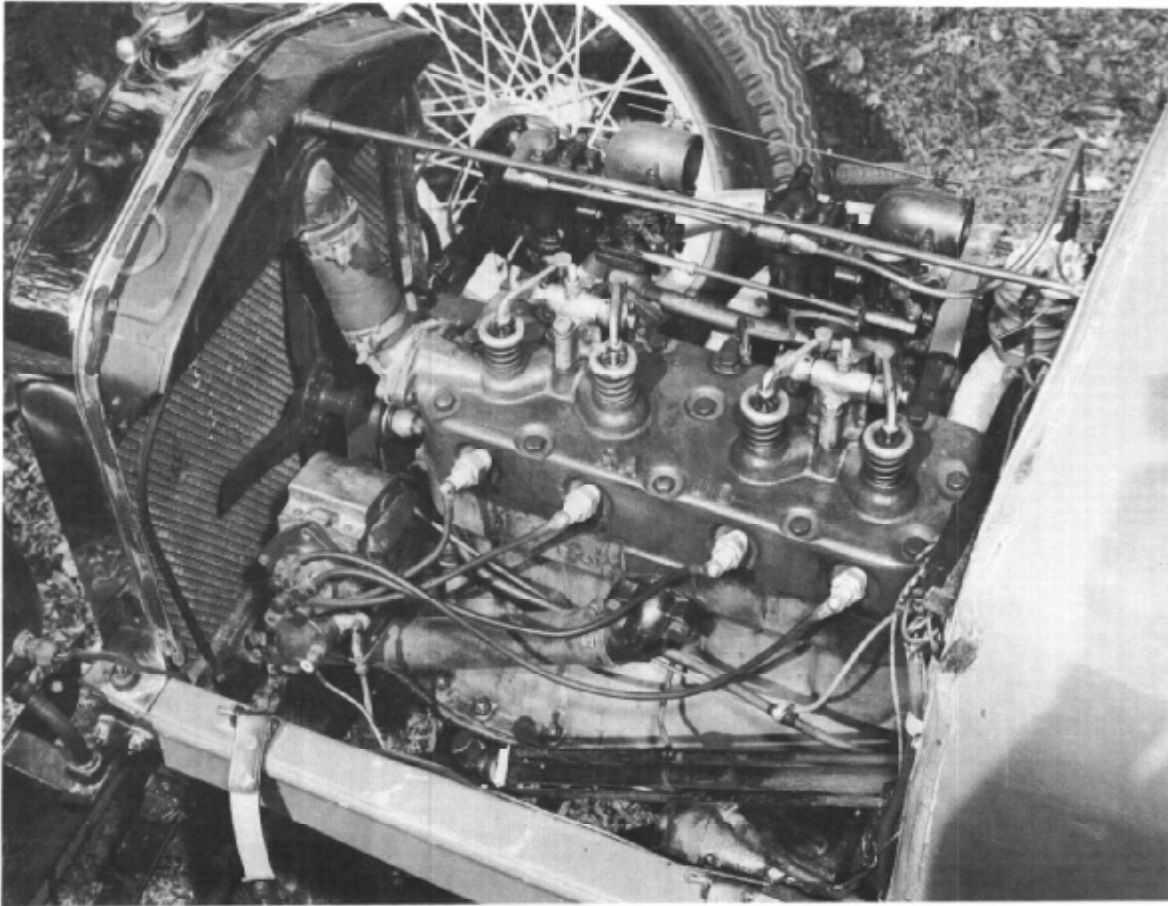
By 1919, Robert M. Roof had incorporated with other interests, and according to an ad of that year, they made all the equipment necessary for speedster and racing Model T Ford automobiles. This ad also states that the men using Roof products in racing cars had done so well that they had practically driven the higher-priced cars from the dirt tracks of one-half or one mile length. At that time a complete sixteen-valve head, complete with cover, manifolds and valves, etc., cost \$115.

In 1915, Carl "Pop" Green, owner of Green Engineering, of Dayton, Ohio, introduced lighter parts for the T, including Aluminite pistons and connecting rods. He



Sixteen-valve Craig-Hunt head, owned by R. L. 'Doc' Pruden. Note that the rocker arms have rollers and that the cam lobes are riveted in place. Lubrication, particularly of the valve guides, must have been a problem. The camshaft was chain driven from the front.





Early RAJO four valve head. This setup has just the intake valves in the head; the standard Ford exhaust valves remain in the cylinder block. One advantage of this system is that it is not necessary to cut the firewall for clearance, as is necessary for other overhead valve conversions. This engine, owned by H. D. Thompson, Jackson, Tennessee, features dual Winfield SR carburetors and a Splitdorf magneto, but no water pump.

Joe Jagersberger had been a racing car driver for many years and had a great knowledge of how to make an engine develop peak horsepower, and how to rework it so as to make it more suitable for racing. In 1918 some of Joe's friends finally persuaded him to retire from racing for good and to develop a high output cylinder head for the Ford. Joe did just this and in late 1918 introduced the first RAJO cylinder heads. "RA" was for Racine, Wisconsin, and the "JO" was for his name, Joe. also produced an "L" cylinder head for the T which he claimed gave as much power as the overhead setups with less complications. These "L" heads by Pop Green featured greater cooling qualities and the combustion chamber was nearly hemispherical. The spark plug was located over the center of the cylinder.

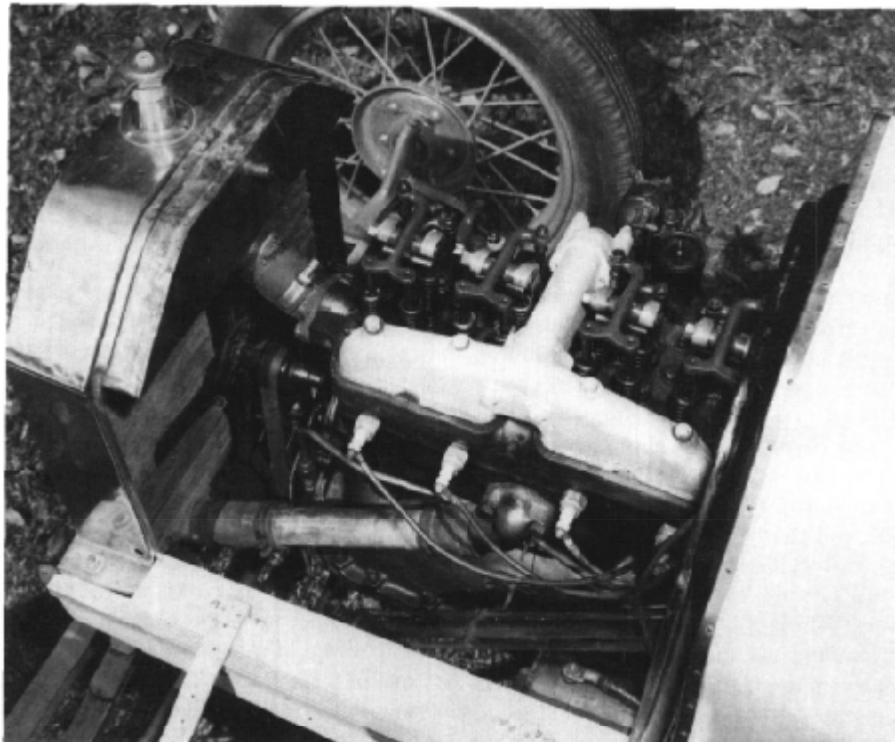
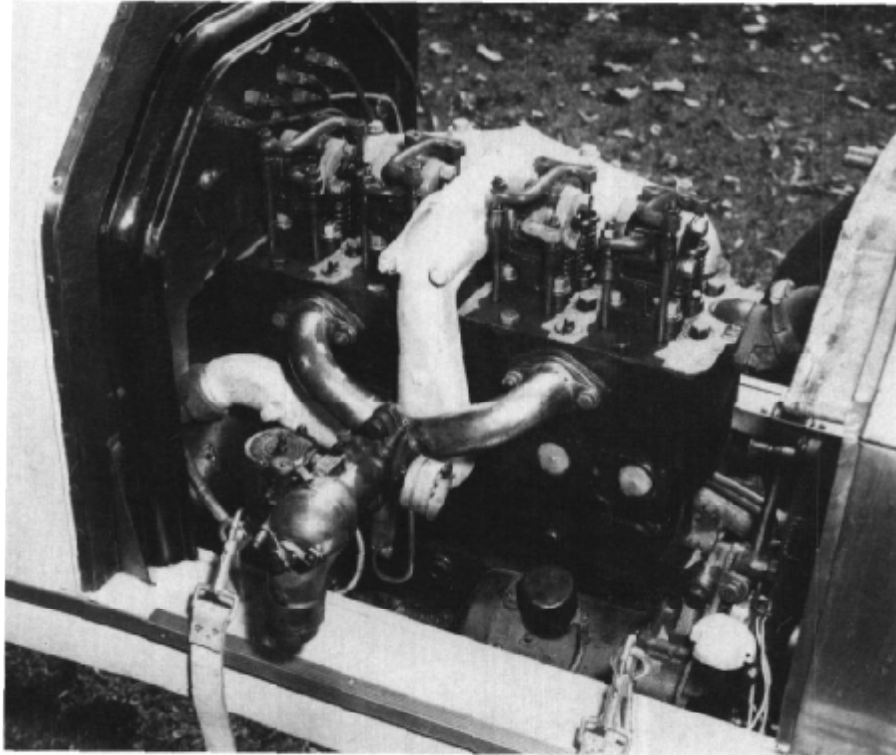
The first head was a four-valve, with the intake in the head and using the standard Ford exhaust valves in the block. Shortly after this, he came out with an overhead-valve head featuring eight valves in the head; both intake and exhaust manifolds on the right side of the head. Next to appear in the RAJO line of heads was the Model

"B. This featured a very large intake valve, and the intake and exhaust manifolds were on opposite sides of the head, the intake being on the right. This was a HOT cylinder head and held its own on the race tracks, but the walls between the valve ports were thin and cracked easily.

In 1924 Jagersberger introduced the Model "C" RAJO and this was the best of that name.

A little incident about the "C" RAJO head which we acquired and which we still use in a sprint race car will serve to show the potency of this head when properly set up. A well known AAA racing car owner and driver of Allentown, Pennsylvania, had purchased one of these heads and he had won his share of races and money with it installed in a sprint race car.

In the mid-thirties, my brother Jake and I purchased this head and overhauled it. We had purchased the Shorty Gingrich Fronty-Ford race car from Lou Heller, of Allentown, also, minus the engine. We installed a new racing chassis, assembling a racing engine for this car (No. 34) using the RAJO "C" head. The cylinders were



Sixteen valve Roof/Laurel Type B head. Owned by H. D. Thompson, this engine features a Stromberg carburetor and is running stock T ignition. These heads were good performers but were difficult to keep in adjustment because of the rocker arm construction. Note that there is no adjustment for the individual valves.

bored out only enough to clean up the walls. We installed new racing pistons, used stock rods, stock camshaft and stock crankshaft (drilled for full pressure oiling). We had Bosch magneto ignition, single spark only, and a single two-inch Winfield racing carburetor. We also had a new aluminum bell housing. For the clutch we took three Model A Ford multiple-disk clutches, took them apart and reassembled the clutch using all steel disks with clutch springs and heavy bolts from a Ford AA truck to increase the pressure so it would not slip.

We raced the car at various race tracks and each time we raced I set the ignition ahead further until we had it set to fire forty-five degrees before top center. In fact, one day when I had the head off, I measured the distance from the top of the piston to the top of the piston travel when the points just opened on the magneto to fire, and it measured seven-eighths of an inch!

One Saturday, at a race (it was an outlaw race), a bunch of our regular competition showed up at the Schichshinny race track near Berwick, Pa. To our dismay there also appeared many AAA cars, drivers and car owners. They figured they had easy picking against us and AAA would never find out about it and fine them for running outlaw. Some hot AAA race cars were there including several double overhead camshaft cars of the latest and fastest type. Also there was "Bill Drake, owner of the "world's fastest flathead race car. His driver was Chet Gibbons, of New Jersey. They were registered AAA members.

We took time trials and had the best time by two seconds with the little RAJO. My brother, Jake, drove the car that day and the way he threw the RAJO into the turns was a beautiful sight. He kept the engine winding tightly and it seemed as though the car was on rails, it handled so well. He took the car out to warm it up for the first heat and while he was winding it up to make sure it was OK, we heard a loud banging emanating from the engine and I knew the crankshaft had broken.

When he came into the pits we checked the engine and sure enough, the crankshaft had broken. While we were wiping our hands, Bill Drake came over and began to look at the engine in our car. Bill said, "They tell me the engine in this car is nearly all stock but I never saw a T rocker arm engine run as fast as this one, and I don't believe it is nearly all stock.

We told Bill it was stock rods, crank, camshaft, etc., but he said again, "You can't make me believe that, not the way it runs! Well, my brother said, "Lay a twenty dollar bill on the hood and we'll take off the head and show you the stock parts! Bill said to us, "You go to hell! - and walked away.

All the older drivers and car owners told us (we were quite young then) that this was the fastest rocker arm T they had ever seen.

One reason we had the T racing equipment was that it delighted us to take so-called obsolete, worn out T material and set it up so that it beat the higher-priced later-model racing equipment with many more cubic

inches than we could get with a Model T engine. Attention to every detail is part of the answer.

In my mind, and in the minds of many other persons familiar with speed equipment for the Model T Ford, the greatest name of all is "Fronty-Ford. Want to know how it all began; what went on behind the scene of this best-known of all speed equipment for the lowly T engine? Relax and sit back while I run over some of the background of this famous name.

Louis Chevrolet was born Christmas day, 1878, in La Chaux de Fonds, in the Bernese Jura of Switzerland. His father was a watch and clock maker and he taught his sons about machinery and tools. In 1888 the family moved to Beaune, a town in Burgandy, France. Louis brother, Arthur, was born here about 1893, and in 1896 another brother, Gaston, was born here.

Louis had a great flair for things mechanical and before he was twenty years of age he had been designing, building and racing bicycles which he named 'Frontenac for the governor of the French colonies in America.

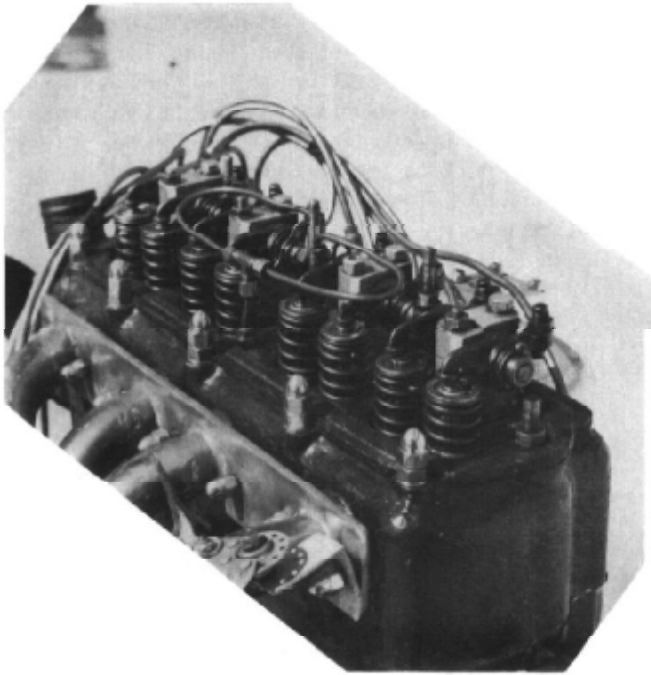
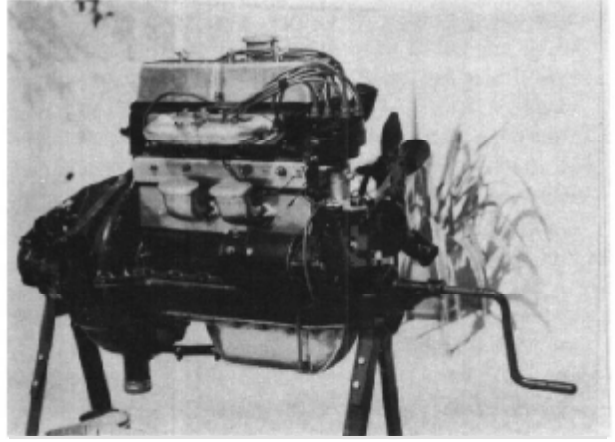
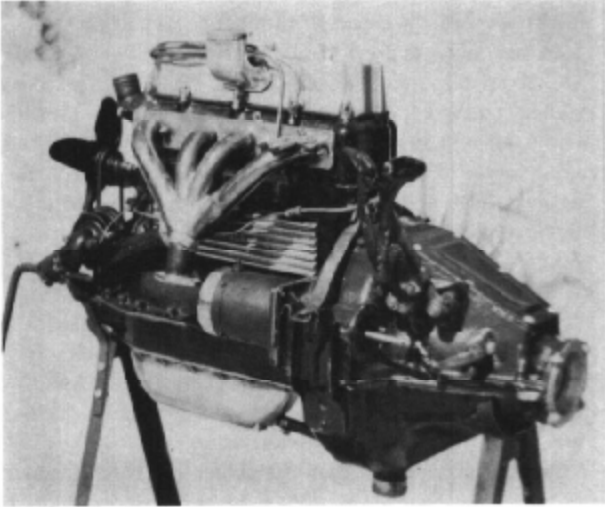
Engines came to be his chief interest, however, and soon he had worked for Dion Bouton, Darracq and others. In 1900 he came to the New World and after spending about six months in Montreal, he went to New York, where he worked for various auto agencies.

In 1905, Louis entered competition in auto racing and won his first event, beating some of the top drivers of that time.

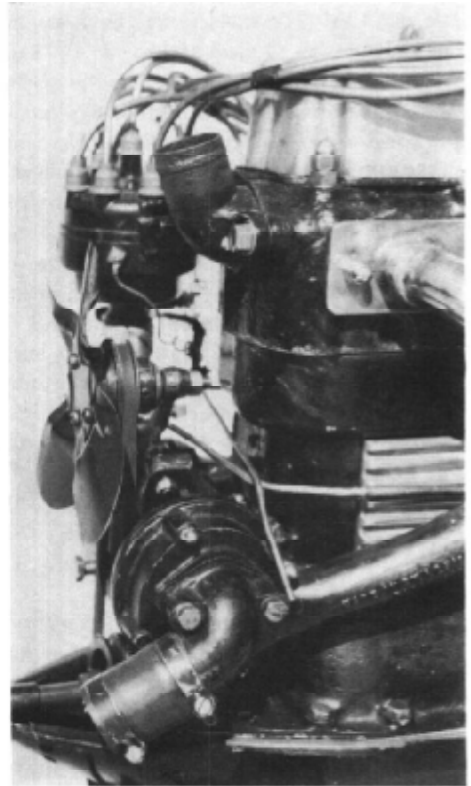
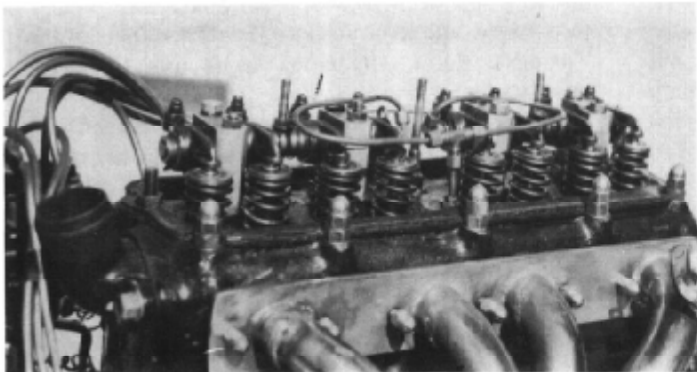
In 1908, W. C. Durant, who had organized General Motors on September 16 of that year, felt he could get some well-known racing drivers to build, race and maintain racing cars, it would promote his interest in building and selling passenger cars to the public in great numbers. He hired Louis and Arthur Chevrolet and also Bob Burman to take some stock Buicks and rework them for auto racing. They did such a fine job of preparing the cars and of driving them that between the three of them they won hundreds of races between 1908 and 1911.

Louis and his brothers were associated with Durant in a different manner in 1911. Durant had just lost control of General Motors and had approached Louis to design and build a new passenger car which he, Durant, could start to build and get back into the automobile building game again. This was done, but by 1914 Louis, due to a number of reasons which would take too long to tell here, sold all his stock to Durant and founded the Frontenac Motor Corporation as his base for future operations.

He hired a talented engineer, Etienne Planche, and together they designed four race cars which they called Frontenacs. The engines in these were four cylinder, single overhead camshaft, with four valves per cylinder. The cars and engines made full use of aluminum alloy and the finished cars were lighter and faster than they would have been if aluminum had not been used. The story of these Frontenac race cars is another story, but is mentioned here because they led up to the Fronty-Ford racing equipment. Louis, Arthur and Gaston all



RAJO head as set up for use in a speedster. This engine features pressure lubrication to the rocker arms as well as to the internal engine parts; the standard RAJO head had to be oiled by hand or by an oil-soaked felt placed on top of the rockers. Notice the large oil sump added to the pan; the front plate which drives the water pump and the distributor; and the many other accessories. Photos through the courtesy of R. L. 'Doc' Pruden, Santa Monica, California.





raced these Frontenacs, along with other top drivers, and they were amazingly successful. These single-cam Frontenacs were used to the end of the 1919 season.

For the 1920 season, Louis had designed a new double-camshaft engine and, together with a completely new race car (he built seven of these), his brother won the 1920 "500 mile race and in 1921, with a new straight eight, double overhead camshaft engine, similar in layout to the 1920 winning car.

An engineer who had worked for Duesenberg in designing engines had joined Louis in 1919. This man, Cornelius W. Van Ranst, had quite a bit of experience in designing high-performance racing engines. Louis wanted to design a new engine for the 1920 racing season. He had built the very first Frontenac engines in 1914. These were called "the iron engines" and were double overhead camshaft type. This engine had been shelved in favor of the single overhead camshaft engine which powered the Frontenac race cars from 1916 to 1919. The "iron engines" had been built from plans drawn up by Etienne Planche. They were designed and built by Louis Chevrolet and Etienne Planche.

Now, in 1919, Louis needed an engine which would put out more power and have still more reliability than the single-cam engine. So Louis dug out the old "iron engine" from its nesting place and both he and Van Ranst, using this engine as a base for a new engine, utilized the best features of the old engine, and added improvements. This, then, was the double overhead

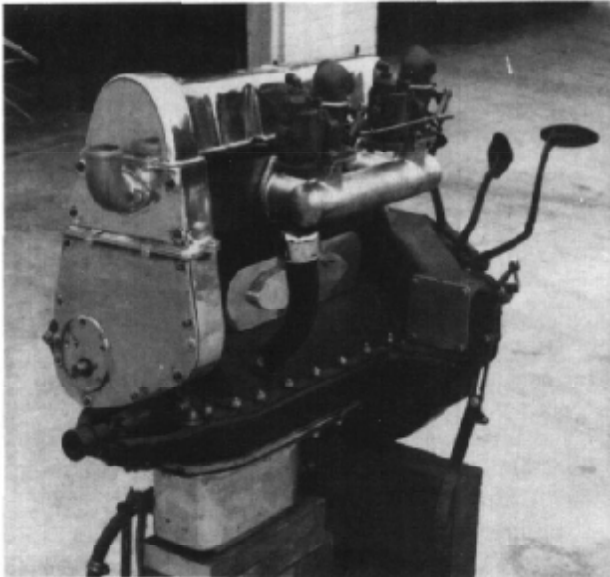
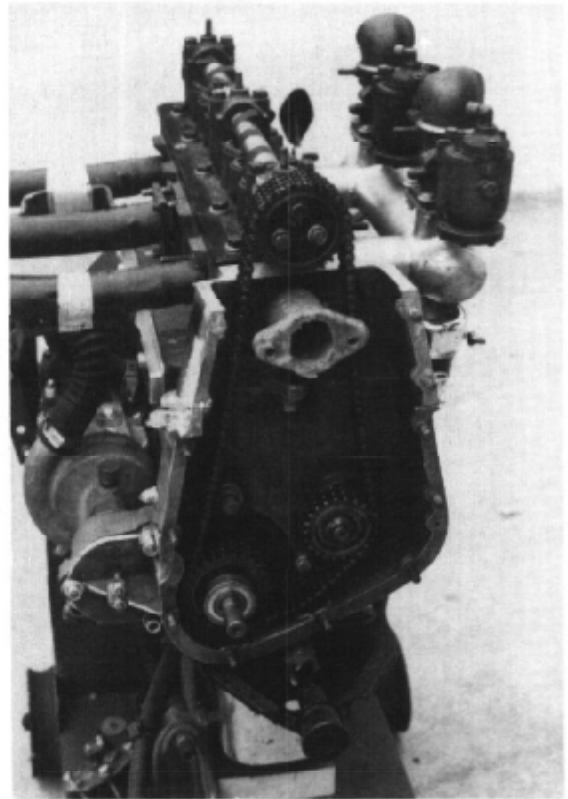
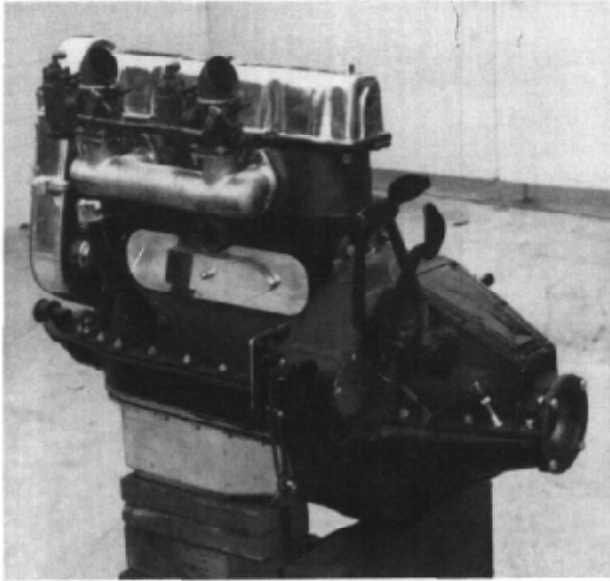
camshaft engine which powered the winning car at the "500 mile race. So you see the first Frontenac engine turned out very well after all.

On Thanksgiving day of 1920, Gaston was racing at the popular Beverly Hills huge board speedway. He was coming into the home stretch when another driver, Eddie O Donnell, pulled from the pit area directly in front of Gaston and his speeding Frontenac race car. Both Gaston and Eddie O Donnell, as well as one of the riding mechanics, were killed in the resulting crash.

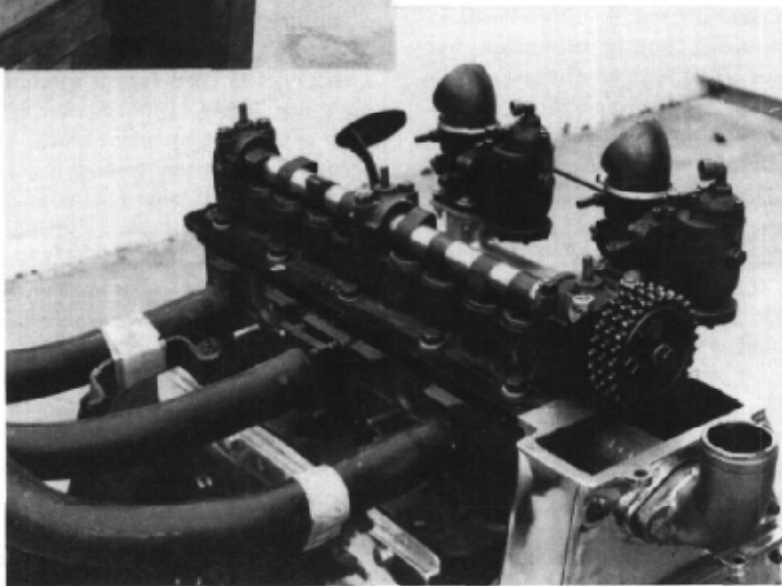
By the time 1920 rolled around, dirt track racing was a very popular sport for the spectators who liked speed, noise and castor oil fumes. Racing on dirt tracks was more expensive than racing on the boards and accidents occurred more often, making it a very costly business. Many speed parts were on the market for the T Ford, including underslung parts by Hassler and racy bodies by Morton and Brett and many others.

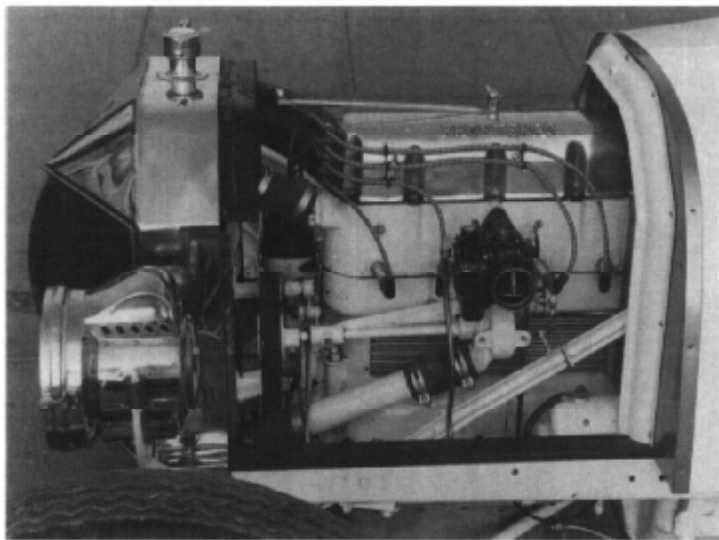
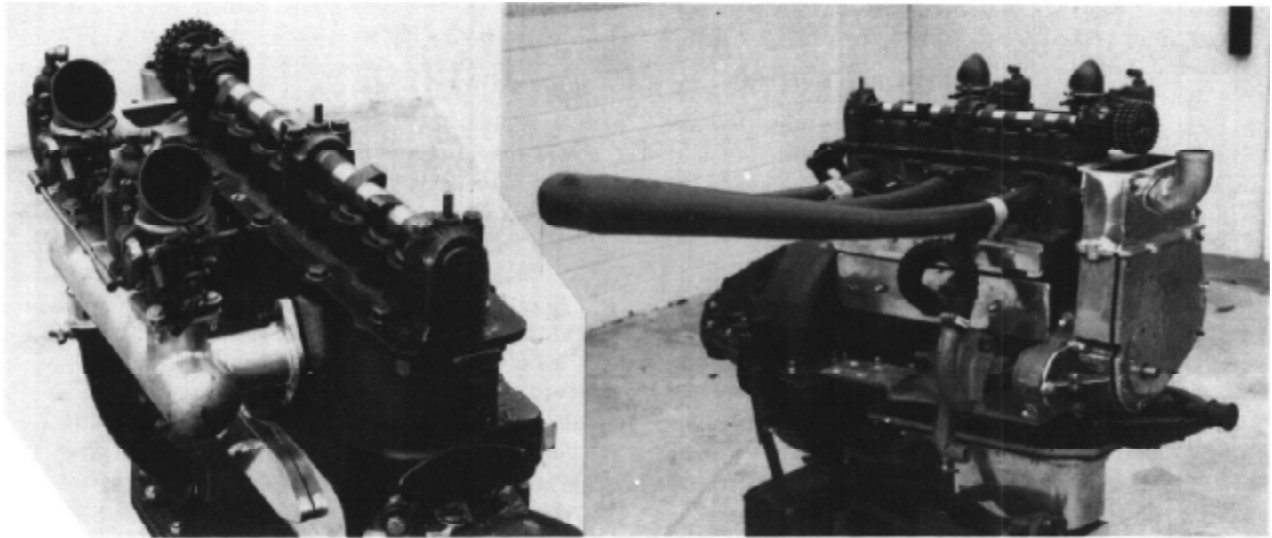
One day during a conversation, Van Ranst suggested to Louis that they design and build a special racing cylinder head and related parts for the Model T engine. They thought that with this equipment they could make up some racers from regular Model T chassis and modify them for racing on dirt tracks using one of the Morton and Brett bodies and other parts. Their idea was to build an overhead-valve head which would be reliable and reasonable in price.

The first head for the T was ready in 1921. It was installed on a Ford belonging to the shop foreman,

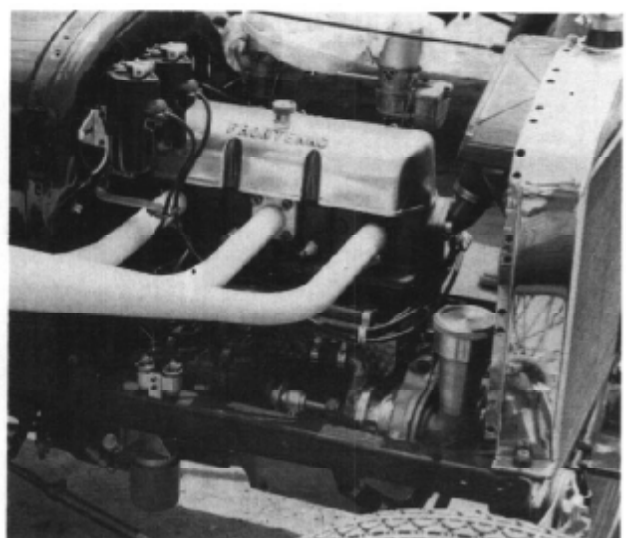
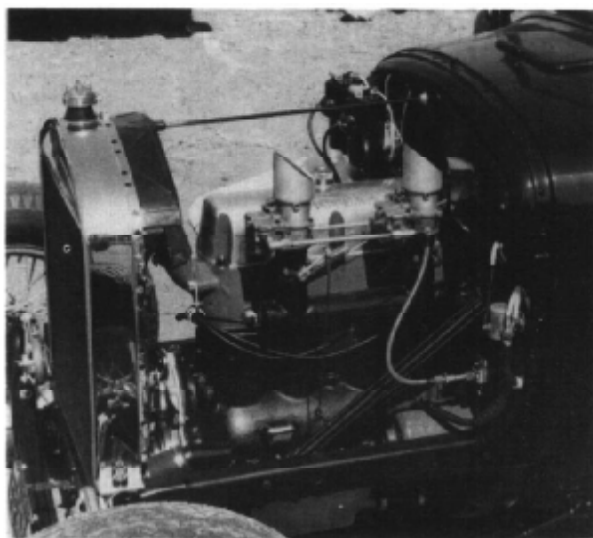


Around 1924 Frontenac made available an overhead-camshaft conversion kit for their "R" and "SR" heads. This assembly is shown here on another engine owned by 'Doc' Pruden.





Left: The Frontenac Model T, S and R heads were similar except for the size of the combustion chamber. All had one intake port (the manifold was integral with the head casting). Below: The later Model SR had two intake ports, provision for two spark plugs per cylinder, and an even higher compression ratio than the Model R.



Skinny Clemons, who gave them permission because they promised to give it to him after they had tried it out on his car.

With this head installed on the Clemons T, it was about the fastest Ford up to that time. During the trial, driving at nearly top speed, they hit a patch of loose gravel on the road and turned over. They slid so far that they wore out all the wooden slats in the roof.

After righting the car, they drove back to Indianapolis to the shop and made plans to put the head into production.

The Frontenac head was successful and reliable, and soon orders were pouring in to the factory for it.

The first head for racing was designated the "R" head, thought by many to have been named after Van Ranst who was the chief engineer.

About the same time, the "T" head appeared. This head had a lower compression ratio and was designed for passenger cars and trucks. A third head, the "S," had a slightly higher compression ratio than the "T" and was designed for use in speedster-type cars. During the first year of production, Fronty heads, installed on Ford T

racing chassis, began to build the Fronty-Ford reputation.

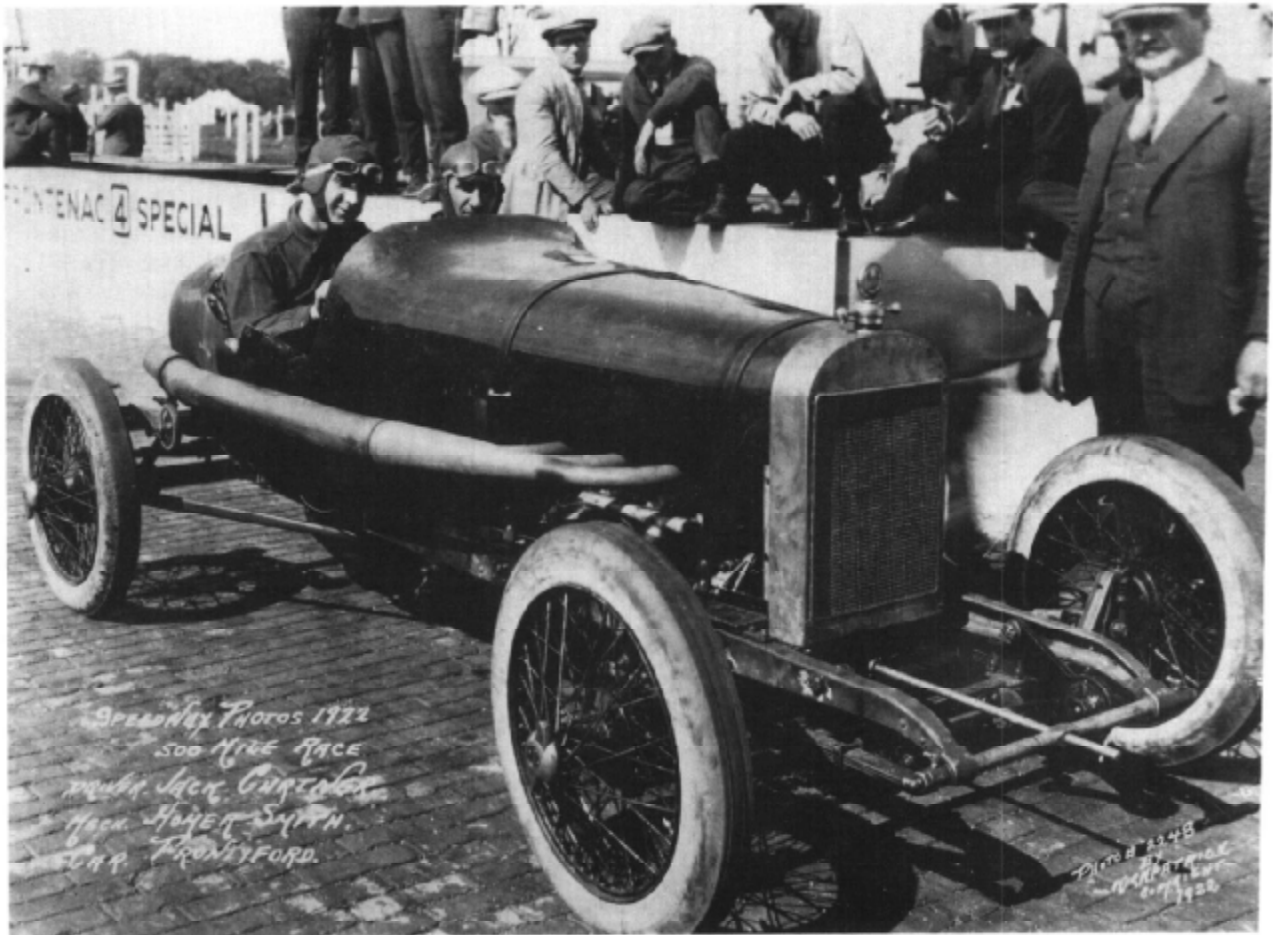
In the 1922 Indy race there were two Fronty-Ford race cars entered, driven by John Curtner and Glenn Howard. Although both Fronty-Fords were the slowest in the "500-miler," they proved to the racing fraternity and to the vast army of Ford owners the higher performance and reliability of Frontenac products which were available to them at modest prices.

The Fronty heads used on these cars were the Model "R." They had one intake port and three exhaust ports.

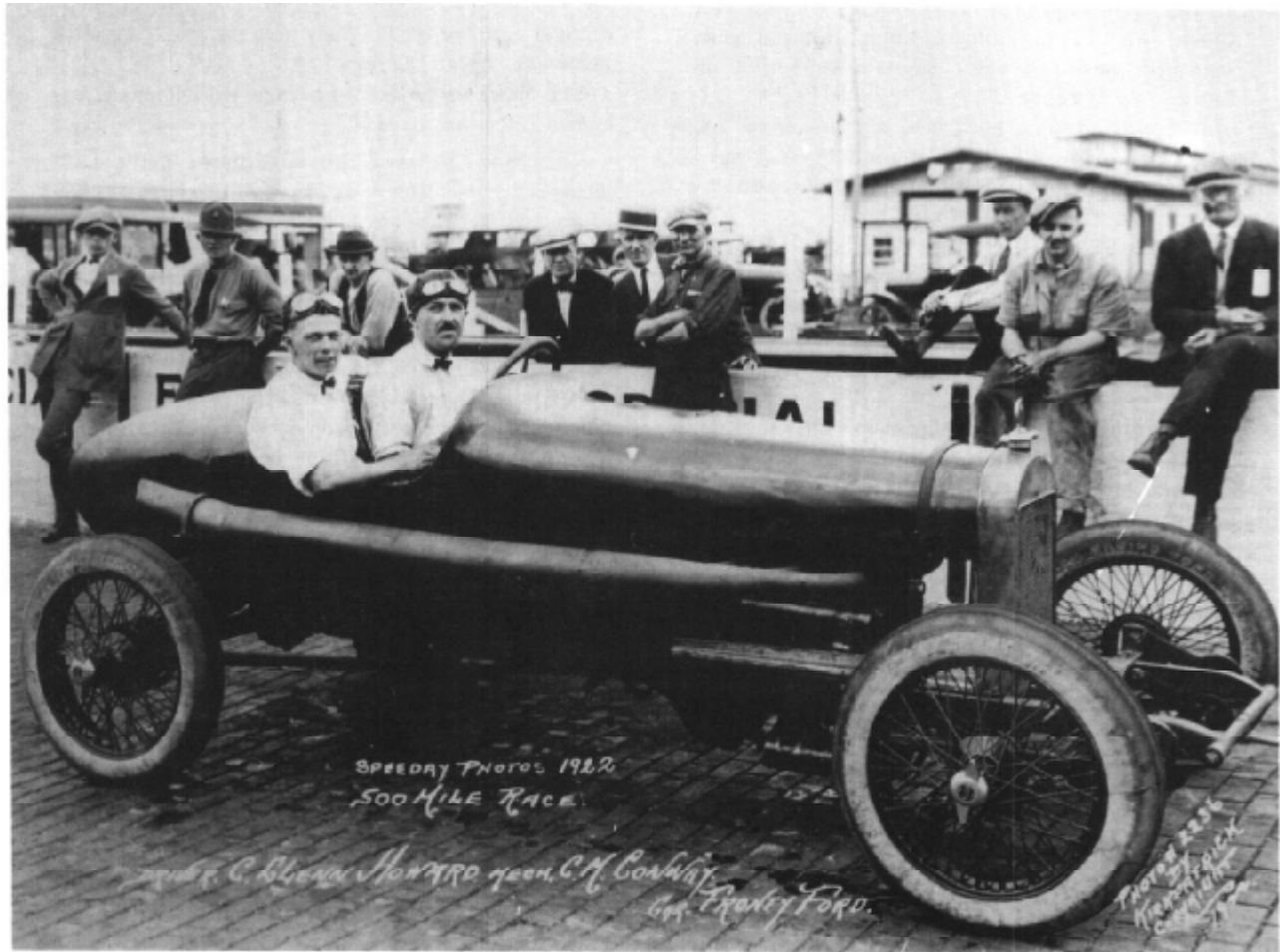
Here are the general specifications of the first Fronty heads, as taken from a very early catalog:

"The Frontenac cylinder head gave the Fronty-Ford the speed, power and stamina to qualify and finish in the 1922 Indianapolis race; two Fronty-Ford race cars accomplishing this feat. No other cylinder head for Ford ever approached this performance. No further recommendation is necessary for Fronty.

"In the Ford owner who seeks the performance of large cars, the salesman who must cover a large territory quickly and the truck owner who wants



One of the entries in the 1922 Indianapolis "500" race was this Fronty-Ford. The driver was Jack Curtner and the mechanic was Homer Smith. Indianapolis photos courtesy Indianapolis Motor Speedway Corporation.



The other Fronty-Ford in the 1922 Indianapolis race was driven by C. Glenn Howard. The mechanic was C. M. Conway. Notice that both of these cars have special frames and front axles but that the rear axles are standard Ford. Indianapolis Motor Speedway photo.

more power and economy of operation, dealers find a ready market for the Frontenac cylinder heads. The Fronty greatly increases power and gasoline mileage, and eliminates vibration and overheating. The Fronty-equipped engine can easily be throttled to five miles an hour - then accelerated to forty miles an hour in sixteen seconds; by actual tests, twenty to twenty-five miles per gallon of gasoline may be had.

"Frontenac cylinder heads are made in three models, the difference being in the size of the combustion chambers. Valves in the Model "T" and "S" heads have a semi-steel head, carbon steel stem, both of which have proven best for commercial use. Valves in the Model "R" heads for racing are made of tungsten steel. The valves are 1-7/8, with a 3/8-inch lift. Rocker arms are of special design, carrying an offset of 1-1/2 to 1 ratio. They are drop forged of open hearth steel, carbonized and hardened and equipped with a bronze bushing which is removable.

"Rocker arm shaft is made of steel, carbonized, hardened and ground. Push rod is round steel 5/16

stock, hardened at cam end, with hardened adjusting nut in upper end held in place by lock nut. Extra long valve springs are oil tempered. Removable valve guides are extra long, standing one inch above the upper surface of the head.

"Manifold passageways to and from inlet and exhaust valves are larger than the valve area and are free from abrupt bends or corners. Exhaust and inlet passageways and valve seats are surrounded by water. Water capacity of head is one gallon. No water pump is needed on the Frontenac cylinder head.

"Frontenac cylinder heads are complete. Extra parts and other equipment are not needed.

"No. 210. Model "T" head for Ford roadsters, touring cars, coupes, sedans and trucks. Equipment includes 1-1/4 horizontal carburetor, vacuum tank, spark plugs, ignition wires and exhaust manifold. Price, \$115.00.

"No. 211. Model "S" head for Ford converted into speedster. Equipment same as the "T" head. Price, \$115.00.

"No. 212. Model "R" head for Ford converted for racing car. Price, \$100.00. Note: Racing exhaust manifold and carburetor is extra equipment on Model "R" for racing.

Inlet and exhaust ports had a diameter of 1.625 inches. Compression pressure of the "R" head was 85 p.s.i. with standard Ford pistons. The "S" head had 75 p.s.i. and the "T" head had 60 p.s.i.

Late in 1922, in December, Van Ranst, the engineer who designed the first Fronty heads, left Louis to join the engineering department of the Paige-Detroit Motor Car Company. When he left, however, he left Louis with the design of a faster head for the T engines. Here is how this developed -

By the end of the 1922 racing season there were quite a few Fronty-Ford race cars and they more than held their own on the dirt tracks of the nation. The competition on the dirt tracks was terrific and soon there was a demand by race car owners and drivers for a Fronty head which was still faster than the original "R" head. Realizing that the "R" heads were reliable, but needed more power and speed, instead of trying to change the

"R" head, Van Ranst designed a completely new cylinder head for the T. These were the plans he gave to Louis when he left the firm.

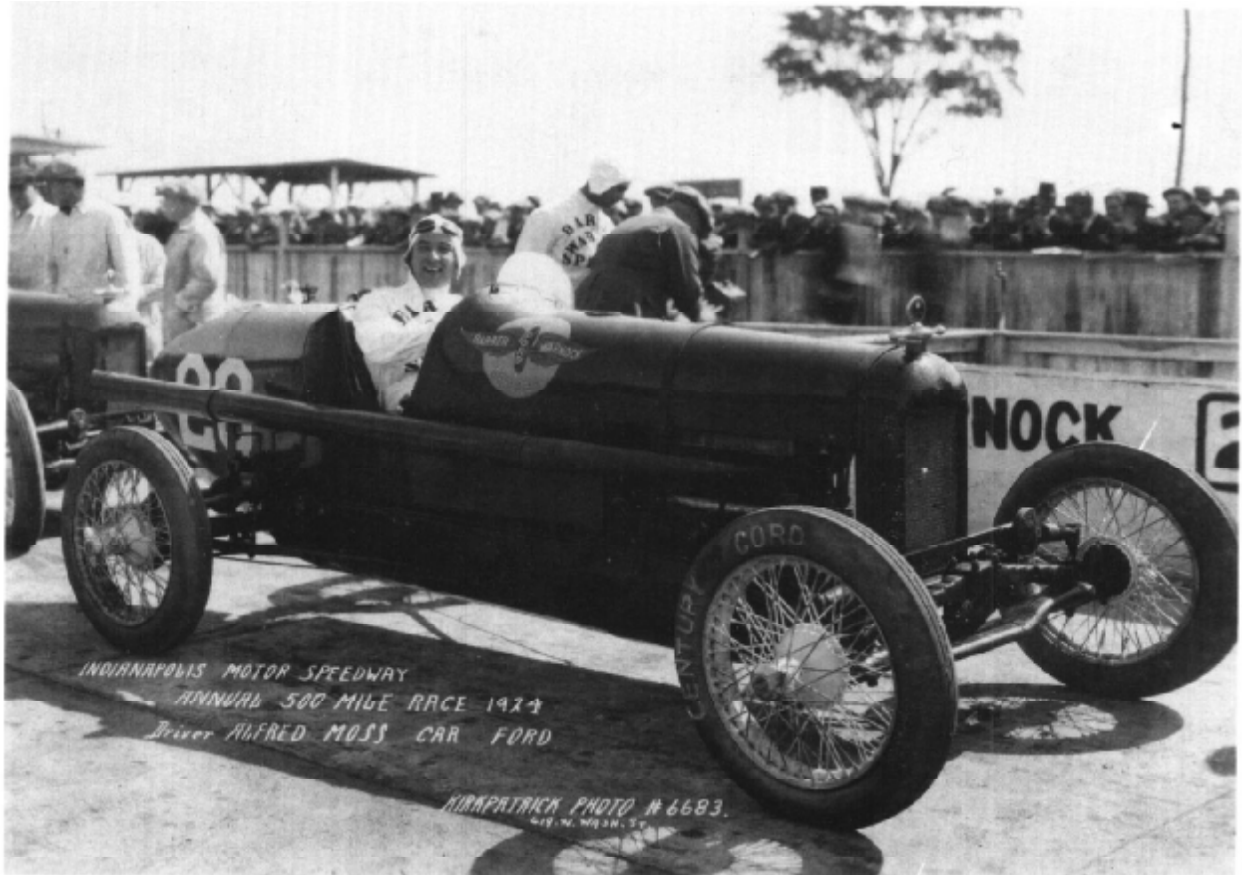
This head, which was to become world-famous, was known as the Fronty "S-R."

The "S-R" featured two large intake ports, 1.75-inches in diameter, and this meant that two large carburetors could be used on it. It also had a very desirable feature - twin ignition - two spark plugs per cylinder, one on each side and, of course, a two-spark magneto was needed for this feature. Compression was boosted to 100 p.s.i. These features of the "S-R" made for outstanding performance on the dirt tracks. Drivers and owners using these heads on their big cars were winning races all over the country. In fact, they won so many races with these fast, reliable heads that to keep in competition, a driver needed all the power he could get. Sales of Frontenac heads were so great that Arthur Chevrolet, Louis' brother who was in charge of manufacturing the heads, was working many hours overtime each week, together with his working force.

In 1923, the Fronty-Ford entry for the Indianapolis



The 1923 Fronty-Ford entry in the "500" was driven by Lora L. Corum. This car featured the Fronty S-R head and finished fifth, the best position in any of the Indianapolis "500" races in which Fronty-Fords were entered. Notice that this year only one man rode in the car. Indianapolis Motor Speedway photo.



Of the three Fronty-Fords entered in the 1924 Indianapolis race, two were similar to the 1923 entry. This one, using the "S-R head, was driven by Alfred Moss. Indianapolis Motor Speedway photo.

"500 race sported a Fronty "S-R head and was known as the Barber-Warnock Fronty-Ford, after the name of its sponsor, the local Ford dealer. Lora L. Corum was the driver; the car was prepared in its entirety by Arthur Chevrolet and his factory force. According to articles on this 1923 Indianapolis race, the "S-R equipped Ford did a remarkable job and also had, by far, the noisiest exhaust of all the cars in the race. Here is a quote from an old magazine of the period:

"The Barber-Warnock entry, the Fronty-Ford that was revised by Art Chevrolet, and using one of the new S-R heads, was a great favorite. The consistent performance of the two Fronty-Fords last year was remembered and when this year's entry started so well, nearly everyone wanted it to finish well up in the race. The fact that it finished fifth pleased everyone except the cars that finished the race after it.

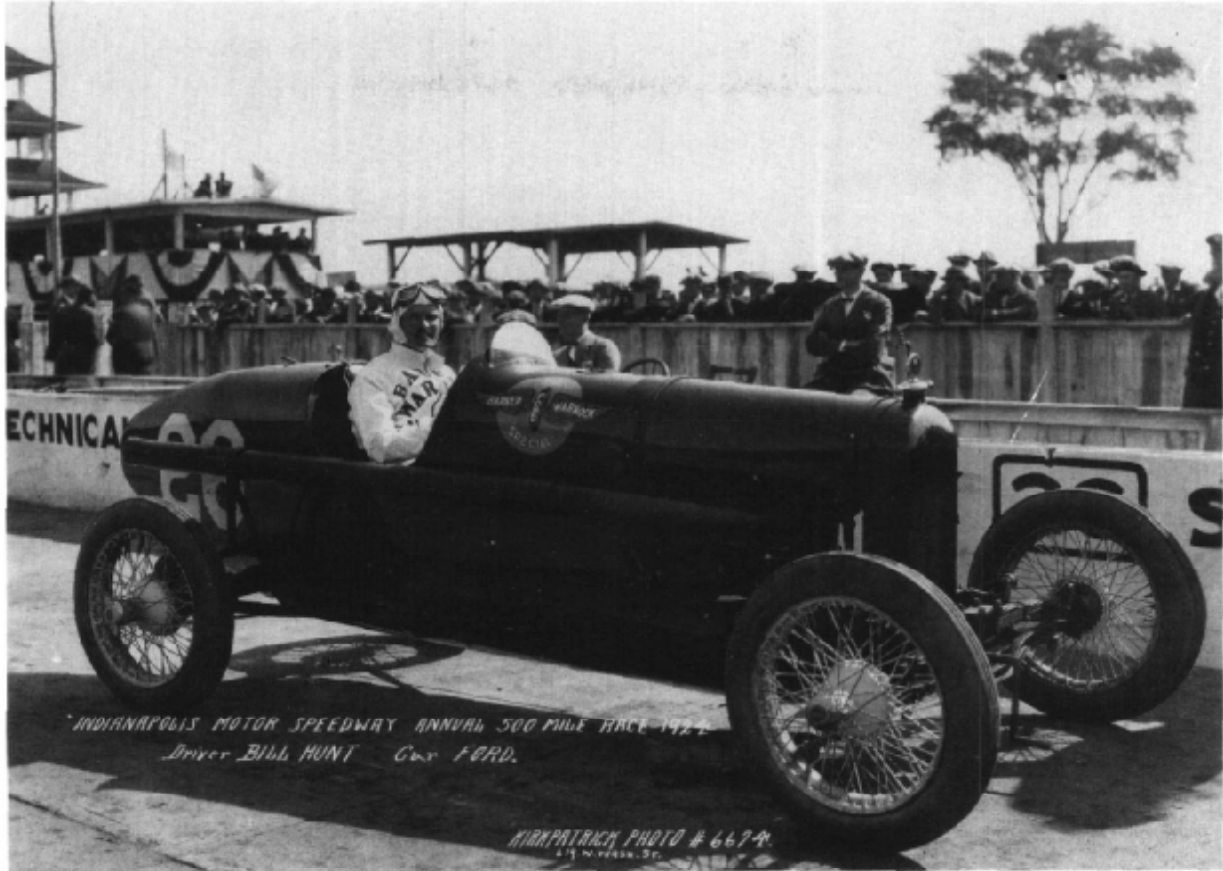
"This Fronty-Ford was a consistent performer. It did not change drivers nor tires and maintained an even pace. Really, the other cars seemed to slip back of it, rather than Corum getting ahead of them. To make the entire distance with the same driver and

tires was quite a feat in this race and Art Chevrolet was much congratulated.

Another publication stated, "When Corum dashed across the finish line he drew the loudest and longest applause ever heard at the speedway. After all, out of the 150,000 spectators, there were very many of them with a fine ardor for the "T Ford cars and these owners shouted themselves hoarse every time the little underdog completed another lap. Arthur Chevrolet had prepared this car number 23, and its truly remarkable performance made him one of the heroes of this year.

In 1924, Frank Lockhart was barely known in racing circles. He was driving race cars on the West Coast with just average success. Then he purchased an "S-R Fronty head, installed it on a sprint car and began to win nearly every race in which he entered. This was the start of a career of one of the top drivers ever to push a throttle to the floorboards.

The amazing success of the Barber-Warnock entry in 1923 fired them to prepare three cars for the 1924 Indianapolis race. Two of the cars were equipped with S-R heads; Bill Hunt driving one of them, and Alfred



The other entry in the 1924 race was this car, driven by Bill Hunt. This is the same car that finished fifth in 1923. Indianapolis Motor Speedway photo.

Moss, father of Sterling Moss, driving the other. One of these cars was the one which had finished fifth in 1923. Great hope was held for these little cars as they were underdogs in price, power and looks.

The third entry of the Barber-Warnock Fronty-Ford team was equipped with the most famous head ever to be bolted to a T block. This year at the Indy race there appeared the Model "DO" Frontenac, a double overhead camshaft head with sixteen valves, two each of inlet and exhaust valves per cylinder. These three race cars ran with their usual consistency; no drivers needed to be relieved and their speed would have placed them among the first ten in the 1923 race. But in the meantime, the pure bred racing cars with their astronomical price, were developed to such a high degree of performance and reliability that the Ford entries were no match for them.

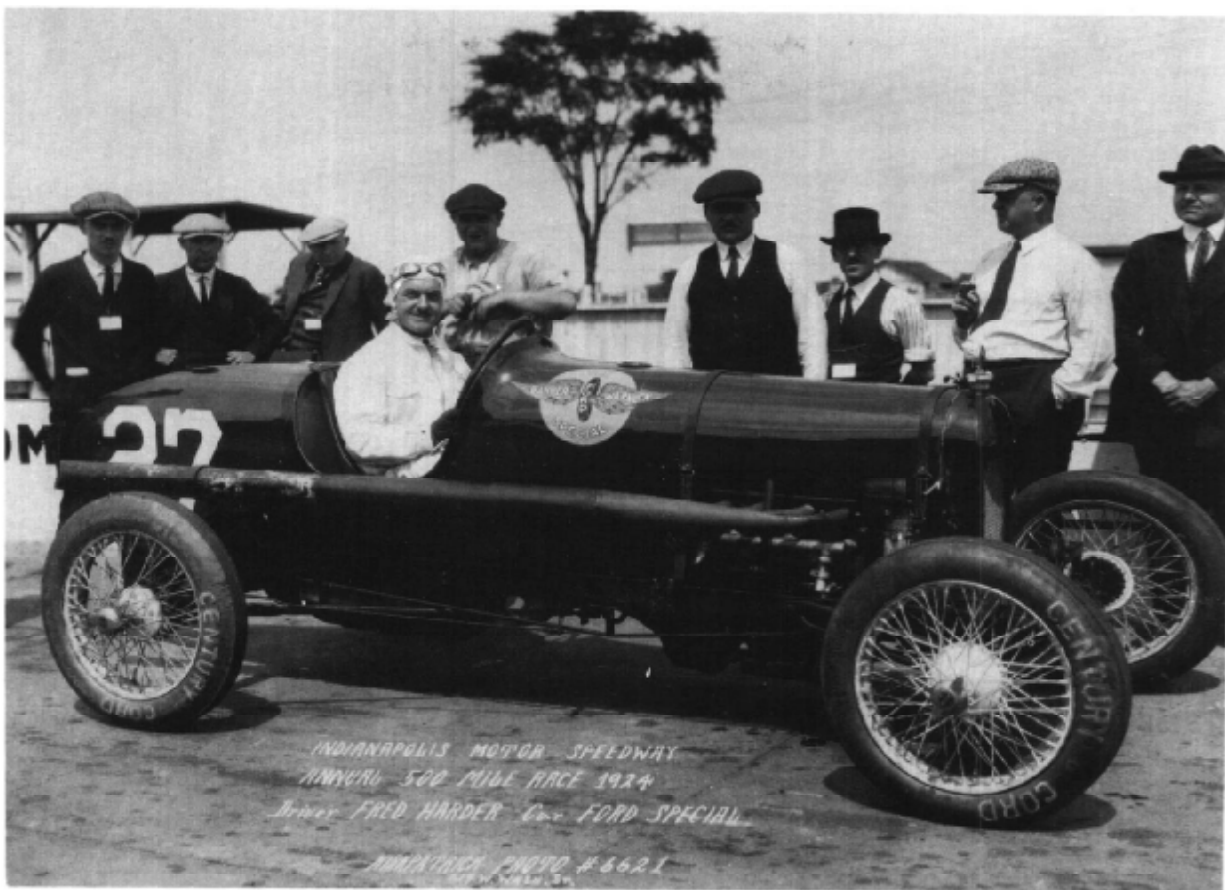
For the 1926 season, Louis Chevrolet built a brand-new Fronty-Ford for Indy. It sported a front wheel drive and was known as the Hamlin Special. In this car the Ford engine, equipped with the DO head, was actually reversed in the chassis. The ninety-one cubic inch displacement was accomplished by sleeving the

cylinders in the T block and machining a crankshaft with a short stroke of three and a half inches. The bore was two and seven-eighths inches. This engine was supercharged and turned in excess of 6000 rpm. Jack McCarver qualified the car in the 9th row ahead of Pete DePaolo's Duesenberg, but lost a connecting rod bearing on the 22nd lap.

In 1932 this car was still running and known then as the Ray Day Piston Special.

In 1930 a Fronty-Ford equipped with a single overhead camshaft head, was prepared by Arthur Chevrolet and driven by Chet Miller, who eventually became a famous racing car driver. An article in a magazine of that period states: "A racing car that can be bought retail for \$2500 was the Fronty-Ford, consisting of Model T Ford parts except for the Fronty head, pistons, rods, crankshaft and rear axle shafts. Chet Miller set out to average 100 mph and, but for minor mechanical troubles, might have attained this goal. As it was, if a forty-one minute pit stop to replace a broken front spring is deducted, his average becomes 96 mph.

The replacement of this spring is one of the funniest



New for the 1924 race was this Fronty-Ford which featured the Frontenac "D-O sixteen valve dual overhead camshaft head. The driver was Fred Harder. Louis Chevrolet (in the black vest) is also seen here. Indianapolis Motor Speedway photo.

happenings at a race in many years. Chet Miller swears it is true. When he stopped on the 92nd lap to adjust the carburetor, the technical committee discovered the front spring broken close to the spring mounting eye, and refused to let him proceed until it was replaced. Lacking a spare spring, Miller and his mechanics ran back into the infield, found a Model T Ford with no owner nearby, removed the front spring, put it on the race car and continued the race until flagged. Then the spring was removed and reinstalled on the Ford car before the owner discovered what had happened.

In 1931 Gene Haustein, in a car similar to that raced by Chet Miller, lasted for twenty-three laps when the car threw a wheel. This is the last time Frontenac equipment was used in the big-time racing. However, on the dirt tracks across the nation the name Frontenac and Fronty-Ford was still the name to denote speed.

The engine in the racing car driven by Chet Miller was equipped with a single overhead camshaft. The R and S-R heads had proven themselves reliable and in 1927 Arthur Chevrolet had designed and built equipment which,

when installed on these heads, made them even faster. In particular, the S-R with the single overhead camshaft proved fast and reliable; the engine was able to turn over many more rpm's due to fewer reciprocating parts and the better valve timing with the factory-manufactured camshaft.

Many drivers state that these SOHC setups on racing engines were better than the Model DO and gave far less trouble. One of the most famous of these SOHC conversions was owned, built and raced by the three Tadlock brothers, John, Monk and Eldridge, from Virginia. This car won a lot of prize money in AAA races in the East. Later on, this engine was installed in the former Ben Shaw chassis which had formerly housed a very famous DO Fronty engine. I raced this combination many times and it was fast and reliable; never broke down, had terrific acceleration and had a wonderful exhaust sound.

In 1931 Arthur Chevrolet introduced the famous stagger-valve Fronty head for "A Ford engines. These double overhead camshaft racing cylinder heads were so-called (stagger valve) because that is exactly the way the

valves were laid out. In the Model DO head, the exhaust valves were so close together that there was no room inside the head for cooling water to dissipate the tremendous heat developed during a hotly contested race, and cracks developed eventually in many of these heads. To eliminate this problem there were sixteen valves, four per cylinder, but in this stagger-valve arrangement there was one intake and one exhaust valve on each side of the cylinder. There were five ports on each side of these heads; two intake and three exhaust.

About seven of these heads were built. The first time they were used in competition was at the Milwaukee track on August 29, 1931. One of the cars had been purchased by Louis Schneider with some of his winnings from the 1931 Indianapolis race. The other car was campaigned by the designer and builder, Louis Chevrolet. This makes up a complete story in itself - the story of the Frontenac material for the A and B Fords.

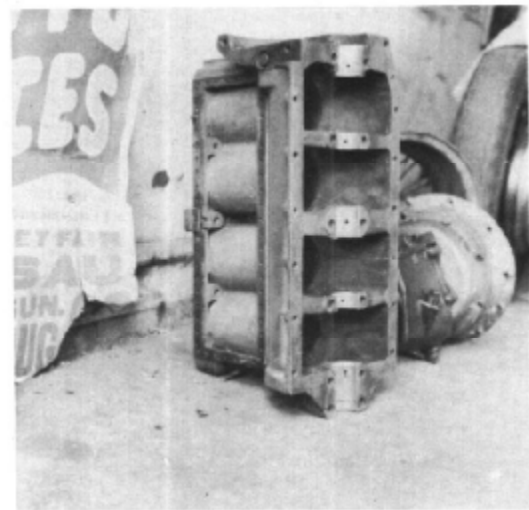
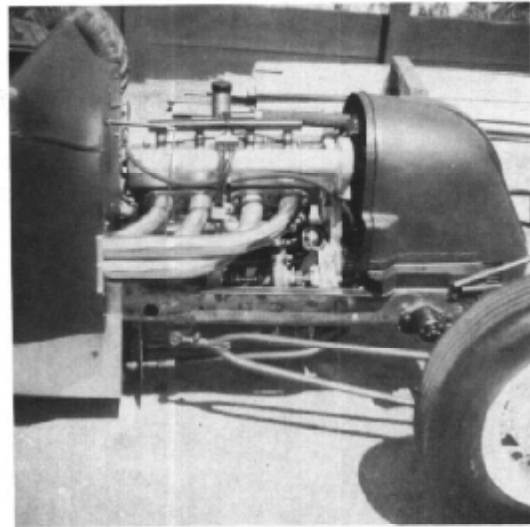
Back to the DO Fronty head for the T engine. Some Fronty records - Dutch Baumann, driving a DO racing car, made fifty-two starts during the 1928 season and won forty-three first places! This record has never been approached in the history of dirt track racing, and this is the best proof we can offer of the speed, stamina and reliability of the Fronty racing cars.

Several other drivers in the Mid-West also have long lists of victories won with their Frontys. Notable among these are Gus Schrader, of Cedar Rapids, Iowa; Ira Hall, of Terre Haute, Indiana, who with Frank Swigert set a new record for a half-mile track of 24-2/5 seconds at Jungle Park Speedway in Rockville, Indiana. This was made by both drivers with Frontys, Model 215-D, DOHC engines. Others who had success with Frontys are Howard Wilcox and Bill Cummings, Bill McCoy and Mark Billman. The Fronty car is recognized as the best all around dirt track car ever built - and with all the above drivers staking their chances on these cars, there must have been a reason.

In 1926, a new DOHC cylinder head was introduced to the racing fraternity. This was the head designed and manufactured by Joe Gallivan, in Rantaul, Illinois. This head featured eight valves, twin overhead camshafts and a train of spur gears to drive the camshafts, instead of a chain such as was used on the Fronty DOHC. This was a well-designed unit and would have done much better than it did, but it was made and sold in limited numbers.

The reason ? Fronty-Ford equipment was very popular due to its performance and reliability, and had built up an enviable reputation in the racing fraternity since its appearance in 1921. At the time that the Gallivan equipment appeared, the popularity of the Ford T had declined and it was only a matter of a few months before Ford stopped production in favor of a new car, the Model A.

It was generally known that Ford would introduce an engine basically larger and better than the T had been, in his new cars, and so before the Gallivan became well



The last entry in the overhead-for-ford Model T field was the Gallivan. It featured eight valves of large size, driven by dual overhead camshafts which in turn were driven by a series of spur gears. Gallivan also manufactured the engine block, in the general design of the Ford block but with five main bearings, and full-length water jackets.

known, the demand for T racing equipment dropped off. I firmly believe that this Gallivan would have given a good account of itself had it been sold and used in greater quantities. It was a good, fast unit.

This is by no means the complete amount of racing equipment which was used on racing cars and speedsters. It would be well to mention some of the speed material used in conjunction with the racing heads, etc.

When the first speed equipment was being bolted to the T engine, it made a decided improvement in its performance. However, the bottom end - the crank-

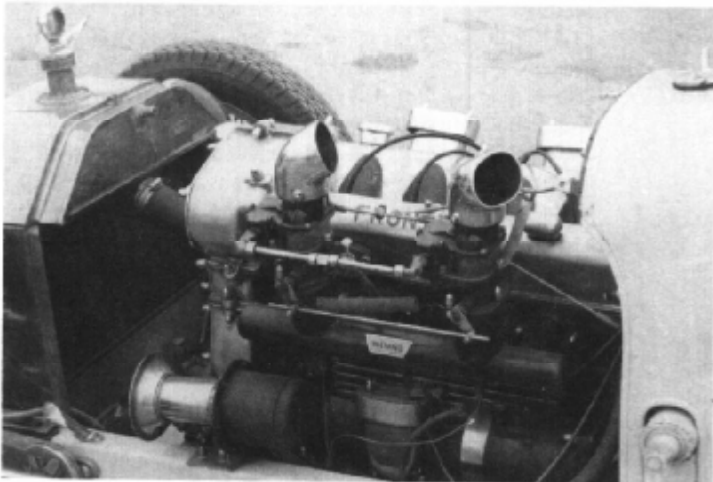
shaft, rods and pistons - were not designed and built to take the added strain imposed by this modification. Many drivers heard expensive noises coming from the engine compartment and upon investigating, found themselves sick in the stomach when they viewed the large holes in the engine where rods and pistons had come through. After spending considerable time, money and effort to convert the T into a fast automobile, it was rather sickening when the engine flew apart.

First the crankshaft was removed, when building a hot T engine, and drilled so that oil fed to the mains under pressure, could be routed to the rods, too. By utilizing a high-pressure oil pump to accomplish this, it also threw more oil around inside the engine for better lubrication of the pistons, cam and so on.

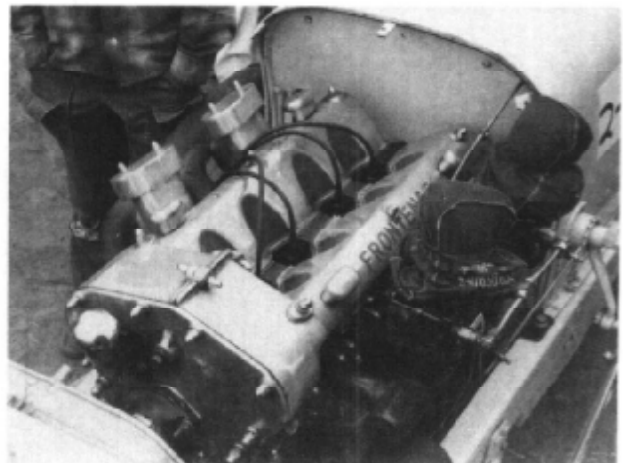
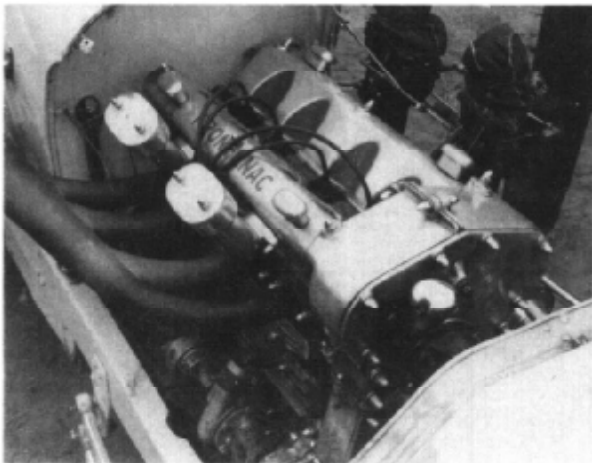
Then came lighter pistons to reduce the load on the bearings. One of the early pioneers was Carl "Pop" Green, of Green Engineering, Dayton, Ohio. He introduced Aluminite pistons and connecting rods in 1915.

As the engines developed still more power, heavier than stock crankshafts were designed, built and offered to those hotting up their T engines. This was fine but some of the more enterprising race car mechanics were wringing so much power from the engines that some of manufacturers offered tubular connecting rods for T's costing about \$210 for a set of four; billet crankshafts costing \$250, and using special rods, pistons and special high-pressure oiling systems using a dry sump to keep a minimum of oil in the crankcase to eliminate fouling. Special drives for high-tension magnetos and water pumps, larger and more efficient radiators were utilized to keep the T engine together while it was developing four, five or six times its original horsepower.

Many people thought it was the Ford V-8 that started the hot rod craze. Just remember - almost every trick used on the V-8 had been used before - *on the Model T Ford!*

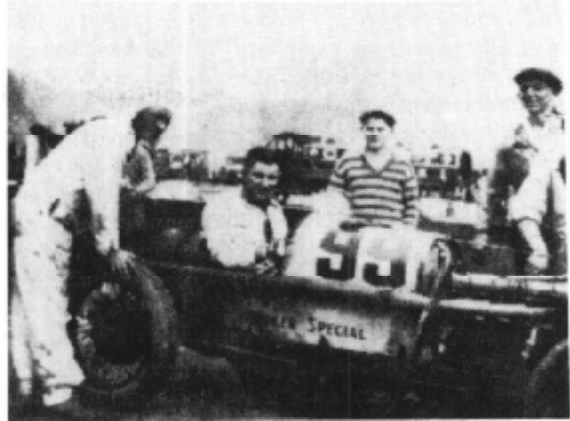


Doc Pruden's DO Fronty, mounted in a race car chassis. This car has been a favorite at the Long Beach Hill Climb for a number of years, and has been recently sold to Gilbert Erickson of Gilbert Metal Products, in El Monte, Calif.





The Hooker Special, owned by Lindley Bothwell (in the car). The car was originally sponsored by Harry Hooker, an Arizona rancher, and held a number of dirt track records in the late twenties. The engine was (is) Model T with an overhead cam head designed by Harry Miller.



An interesting side light to the Model T racing story is this letter written to an unknown newspaper, in answer to an earlier article, also unknown. The clipping was submitted by Otis Clinton, Seattle, Washington.

The car, No. 99, the Hooker Special, was featured on the cover of *The Vintage Ford*, Volume 6, Number 4 (1971) and is presently owned by Lindley Bothwell, Woodland Hills, California.

"In your August issue you had a story that brought back to me many memories. That was the story of Fred Frame. In this you stated that the No. 99 Hooker Special was probably the fastest that ever ran.

"I want to contradict that because I was there and believe me, the Model T of Ed Winfield had it all over old 99.

"I may be mistaken, but to the best of my recollection, Winfield beat 99 every time they met for the year that Winfield was running. Winfield's T, which was a flathead roller tappet job, turned a lap at Culver City [California] on the boards at a 132 average.

"I am enclosing a picture of both cars that I thought you might find interesting. The picture of Winfield's car shows Ed Winfield at the wheel. The picture of Hooker's car shows Bill Spence at the wheel.

Fred W. Fromm
Atlanta, Ga.

