

Overhead Valve Heads for the Model T

By THE JARVIS COLLECTION

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Alderwood Manor, WA 98036

The search for the elusive Model T Ford overhead involves a lot of time and a lot of people. I would like to thank the following for their help: Mike Yeakel, Jim Bums, Ric Nowak and Layden Butler. I would also appreciate comments, corrections, or just correspondence. Write: Jarvis, Box 2245, Alderwood Manor, WA 98036.

The Model T began, as we all know, in late fall of 1908. It probably only took the time necessary for it to become a used car before the young men of the day decided to strip off a few parts to cut down wind resistance, in the hope that it could be made to go faster.

As early as 1914 aftermarket Ford magazines had pictures of beautiful speedsters, and articles on how to lower the chassis and make the T handle better. By this time the speedster body companies were advertising complete bodies or kits.

There is talk that a cylinder head was made by C. D. Noonon of Paris, Illinois, as early as 1915.

In the search for the different Model T racing head, one comes in contact with an almost endless variety. There are over twenty of the flat-head style. Most of the flatheads are the same except for compression. In fact, the Simmons Super Power, the Giant Power, and the Haibe-Hi-Power are all licensed under the Haibe Patent. The Ricardo has a different combustion chamber. The Riley had two spark plugs per cylinder.

The overheads for the T run the total range of man's ideas. There are heads with one valve per cylinder, two valves per cylinder, three valves per cylinder and, finally, four valves per cylinder. Some with one overhead camshaft; some with two. Pushrods were used to operate the overhead valves; most had the pushrods inside the block but at least one had the pushrods on the outside. To operate the valves, one ran ball bearings through tubes, and another used miniature saddles on top of the valve stems.

This article will be an attempt to identify all the Rajo s, Frontys and Roof heads. While some of the heads are similar, they all have a few differences. This identification will be made by means of the intake and exhaust ports, and the location of these ports, as well as spark plug size when it is known.

RULE NUMBER 1. All Rajo s have the intake on the right. The exhaust may vary from side to side, as well as the spark plug location.

RULE NUMBER 2. All Frontys intake on the left, and exhaust on the right.

This does not mean that the Roof tills in all the blanks. Some Roof heads intake on the right and some on the left. But you cannot be sold a head with the intake on the right and have it be a Fronty. Or more important, vice versa.

RAJO:

The factory advertising pamphlets and brochures were usually only issued when they brought out a new model Rajo head. These pieces are usually not dated, and are only for the Rajo heads, plus a few bolt-on accessories they also made. These accessories included offset spindles, valve cover doors, oil fillers, mag plugs and a water pump.

FRONTENAC:

Chevrolet Brothers issued a new catalog every year. They included a little history, what new parts were available, such as special axles, bodies, and what new heads they had produced. All in all a good complete dated catalog. If you are going to step out and buy just one, I would recommend Number 81, issued February 15, 1927. It has more information about the Fronty line than any of the others. Later in the year they inserted a sheet (in catalog 81) on the new single overhead cam conversion for the R (racing) and the S-R heads.

Fronty Catalog 81 has the following information on page 7: If you buy a Fronty Race Car and buy one of their Fronty engines, you can expect the following: Speed - Model R head, 96 miles per hour, straightaway. Model S-R head, 104 miles per hour, straightaway. Model D-O head, 110 miles per hour, straightaway. Later catalogs just say that the speed will vary with the equipment.

ROOF:

Robert M. Roof was the most prolific paper advertising publisher. I have seen over 60 pieces of different advertising for the Roof head. They began in 1917 and kept up a steady stream of advertising until the Model A equipment came out - and beyond. A piece recently turned up on a double overhead cam head for the Ford Six! Most advertising for the Roof is also undated. Dating began when Robert M. Roof sold out to Arthur S. Sinclair in the latter part of 1925. After that date

identical pieces of advertising were used; one with the Roof name and the same piece with the name changed to Laurel. These were the only changes -other than the name change the two pieces are identical.

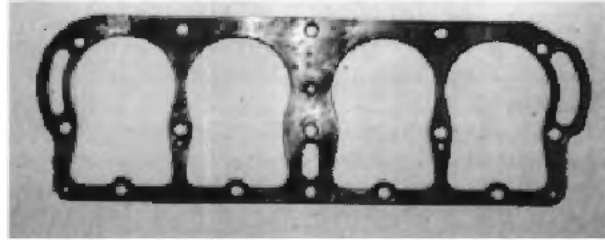
I had hoped to include a list of the combustion chamber volume of all the heads but this is not to be as it is a big task and I do not have access to all the heads shown. What we do know is that the stock T in good shape should crank out about 40 pounds compression. The low or early head could crank out between 45 and 50 pounds. My 4-valve Rajo cranks 55 pounds. Fronty did take the time to list the compression of the different heads. The Model T Fronty is 60 pounds. The Model S is 70 pounds. The Model R is 85 pounds. The Model S-R is 100 pounds, and the D-O is 120 pounds.

EASY IDENTIFICATION OF COMMON HEADS

Left Side	Right Side	Manufacturer	Model and Notes
0	2 intake	4-valve Rajo	Model A
0	1 intake		
	4 exhaust	8-valve Rajo	Model 30
0	2 intake		
	3 exhaust	8-valve Rajo	Model C or 35
1 intake	3 exhaust	8-valve Fronty	Models T, S or R
1 intake	3 exhaust	8-valve Roof	2 intake stub and rocker stands cast in head.
2 intake	3 exhaust	8-valve Fronty	Model S-R. 5 wide at top, 7 wide at bottom, either rocker arm or OHC.
2 intake	3 exhaust	8-valve Roof	Liberty
4 exhaust	0	16-valve Roof	Model A
4 exhaust	2 intake	8-valve Rajo	Model 31. Plugs on left side.
4 exhaust	2 intake	8-valve Rajo	Models B, BB, BB-R. B has standard Ford plugs on right. BB & BB-R have 18mm on both sides.
4 exhaust	4 intake	16-valve Roof	Model C. Rocker arms or twin cams.
4 intake	4 exhaust	16-valve Fronty	DO twin cams.
8 exhaust	2 intake	16-valve Roof	Models B & BB. BB has combustion chamber cut for large valves.

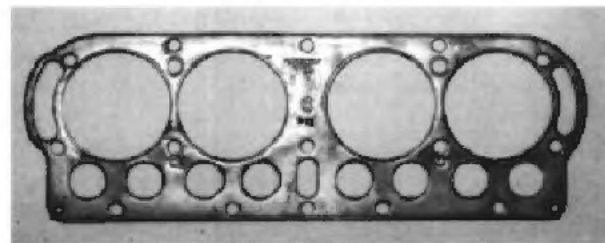
GASKETS FOR MODEL T FORD

OVERHEAD-VALVE RACING HEADS



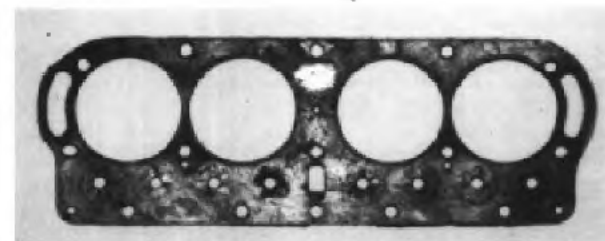
Stock Model T Head Gasket

Victor 101



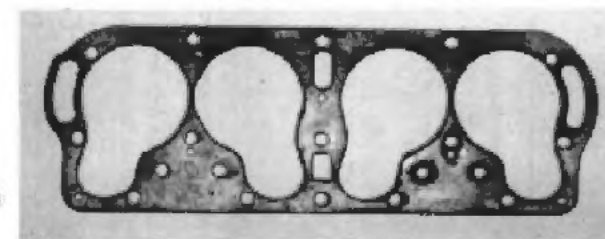
8-Valve Model A Roof

Victor 132
Fitzgerald 101
McCord 5384



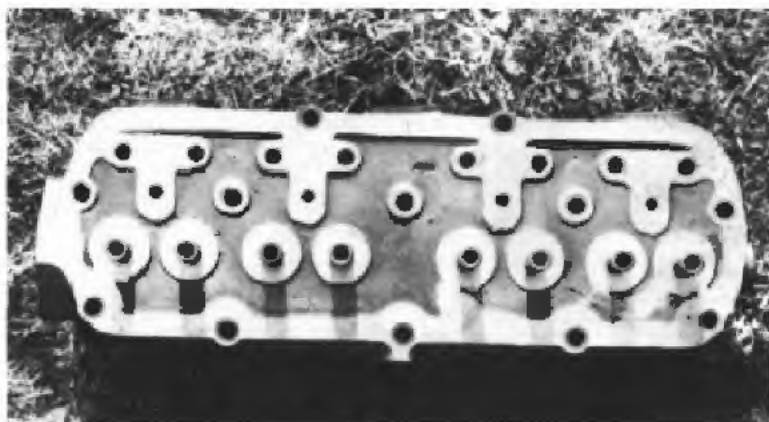
8-Valve Rajo, Fronty and Roof

Victor 328
Fitzgerald 244
McCord 5287

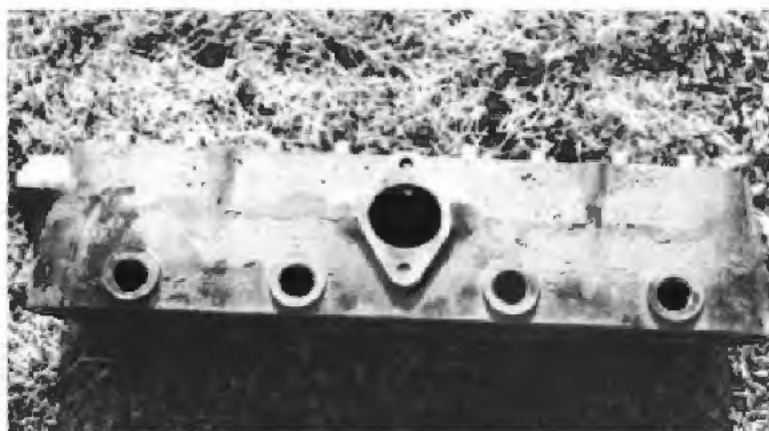
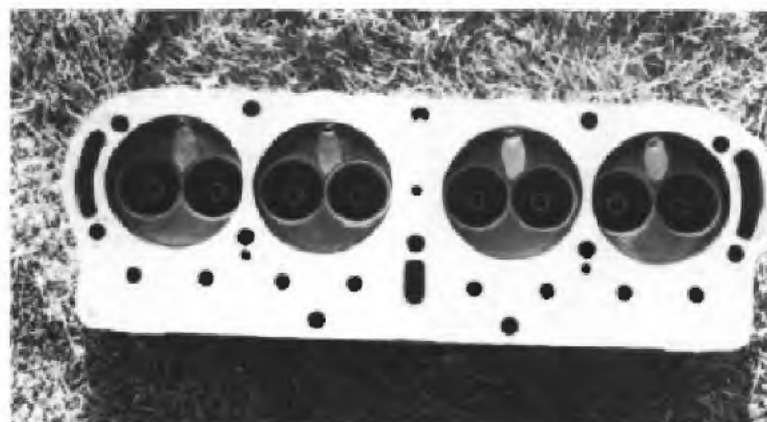


4-Valve Rajo.

Victor 460
Fitzgerald 457
McCord 5298

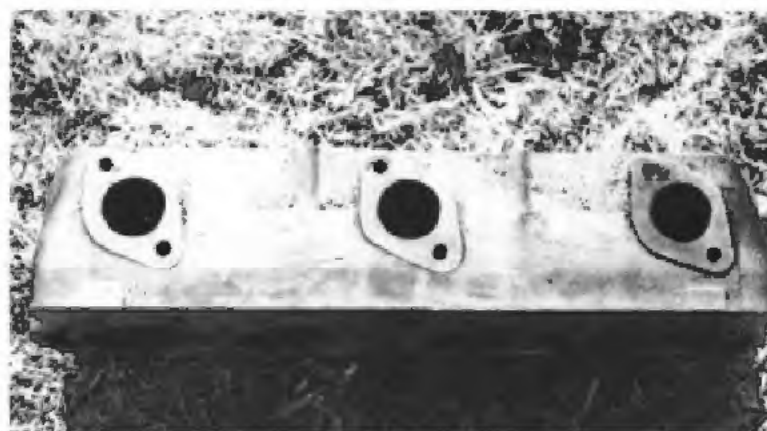


Left side has single intake port. This Model R appears to have an enlarged intake port. Spark plugs are 7/8".



The single port Frontenac was introduced in early 1921. The original patent papers were filed March 13, 1921. The single intake port Fronty came in three models: The Model T, for passenger and commercial cars; the Model S, for speedsters; and the Model R for race cars.

The three heads were the same except for compres-



sion ratio, and the Model R had stronger valves. Most of these heads have their model number stamped into the ridge for the rocker cover. All three models were sold during the 1920's. The 1929 catalog has just the Model R for racing.

The Model R was used on the two cars that ran at Indianapolis in 1922.

CHEVROLET BROS. MFG. CO., INDIANAPOLIS, IND., U. S. A.

Picture to right shows Frontenac Cylinder Head complete, ready to install. The specially designed high velocity manifold is for Ford one-inch carburetor.



Picture to left shows exhaust side of Frontenac Cylinder Head.

Picture to right shows Frontenac Cylinder Head with cover removed, and specially designed high velocity manifold that fits any vertical type of one-inch carburetor.



NOTE: Horizontal carburetor (H); back can be attached; direct to block—manifold not supplied.

Columbus, Ohio, October 25, 1921—100-mile race won by Ralph D. Drusby, driver. Offshoot, second. W. Schloeman, third. All driving Frontenacs.

Cashlag, Ohio, November 25, 1921—Dick Callahan, driving Fronty, sets new state record for one mile in half-mile track. Time: 1.91.

Indianapolis, Ind., May 20, 1922—C. Olson Howard and Jack Christie, driving Fronty-Pinks, qualify for the 500-mile race, being the first Ford cars to ever accomplish this, and were still running when the race was called, averaging 80 miles per hour for the entire 500 miles.

Valmston, Pa., June 18, 1922—Jack Christie, driving Fronty-Ford, turns one lap of 1 1/2-mile Speedway in 41.5 seconds, fastest time ever made officially (A. A. A. meet) by any Ford car. Ninety-two miles per hour.

Cleveland, Ohio, May 23, 1922—Dick Callahan, driving Fronty-Ford, lowers his own state record for one mile. Time: 1.92.5.

Tulsa, Okla., June 4, 1922—100-mile race. First, Ralph D. Drusby, driving Fronty-Ford; second, C. W. Holt, in Fronty-Ford.

Bedford, Ind., September 5, 1922—A. Moore, driving Fronty-Ford, wins all races and gold cup trophy.

Hawthorn, Kan., September 8, 1922—Al Karpis, driving Fronty-Ford, wins two 100-mile and 5 and 10-mile races. T. Bralich, in Fronty, second.

Delroit, Mich., June 18, 1922—100-mile race won by Ralph D. Drusby in Fronty-Ford; McCabe, in Fronty, second; C. G. Howard, in Fronty, third. All three cars ran whole race without a stop.

San Luis Obispo, Cal., May 18, 1922—Fred H. Lindling, driving Fronty-Ford, wins 50-mile race. Time: 30.30.

Nashua, Kan., July 4, 1922—L. E. Kothe, driving Fronty-Ford, breaks track record and wins 10 and 50-mile races.

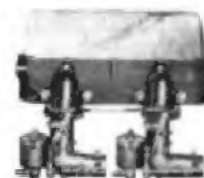
Grand Rapids, Mich., June 17, 1922—100-mile race won by Ralph D. Drusby in Fronty-Ford.

Midwaukee, Wis., July 4, 1922—Arthur Reuch, driving Fronty, wins time trials 1, 2 and 25-mile races, winning state championship.

The Fronty 2-Spark 2-Carburetor Racing Head, Model S-R, for Racing Cars Only



This new model was brought out to meet a demand of the fastest drivers for something faster than the regular Model R. After numerous tests to satisfy ourselves that it was all that could be expected, we gave it the crucial test in the 500-mile race at Indianapolis on May 20, 1922, when we installed it on the Barber-Warwick Special No. 21, which was driven by L. E. Olson. As everyone interested in racing knows this car covered itself with glory. First qualifying at the remarkable speed of 103.2 miles per hour, and then winning fifth place in the race itself, defeating all the famous entries such as Mercedes, Engell, etc., and many well-known American entries, and thereby giving the best demonstration of what a Ford car can really do when equipped with the Fronty head. There were only two stops made by this car during the race, both for fuel, and car ran the entire race without any mechanical trouble or adjustment whatever. There certainly could not be any better demonstration of the power and reliability of the Model S-R head. The main difference between this head and the Model R is in the fact that this head is equipped with two spark plugs per cylinder and can be equipped with two carburetors instead of one. The compression also is higher.



SPECIFICATIONS OF MODEL S-R HEAD

Head Casting—Best steel close grain.
Valves—Eight high tension steel, 1 1/2 in. diameter.
Valve Springs—Same as Model R.
Valve Spring Caps—Same as Model R.
Valve Guides—5/16 in.
Rockers—Same as Model T.
Valve Guide—Same as Model T.
Rockers—Same as Model T.
Fuel Inlet—Same as Model T.
Compression—100 lbs.

Intake—Two intake ports, 1 1/2 in. diameter on left-hand side.
Exhaust—Three exhaust ports on right side.
Spark Plugs—Drilled and tapped for metric plugs, two per cylinder, one on each side.
Equipment—Aluminum cover, 2000, 2000, 100.
No. 114—Model S-R, for racing cars only. \$125.00
No. 115—Model S-R, with two 1/2-inch carburetors and intake pipe. 250.00
No. 116—Model S-R, with two Zenith carburetors, intake and exhaust manifold. 350.00

A FEW RACES AND RECORDS WON AND MADE BY THE MODEL S-R HEAD

Indianapolis, Ind., May 20, 1922—A. A. sponsored meet. Barber-Warwick Special, equipped with Frontenac cylinder head, wins 7th place in 500-mile sweepstakes, averaging 72.58 miles per hour, defeating all famous entries and many of the greatest American cars.

El Wayne, Ind., June 17, 1922—Homer Drusby, driving Fronty, wins 100-mile race, 32 seconds, 10 per hour. Also wins 20, 25 and 50-mile races.

Indianapolis, Ind., July 1, 1922—Chance Kingsley, driving Fronty, breaks track record in Hoosier Speedway. Time: 31.12 seconds. W. Schloeman, driving Fronty, wins 100-mile race; Chance Kingsley, driving Fronty, second; C. Chaney, driving Fronty, third.

South Bend, Ind., July 5, 1922—Chance Kingsley, driving Fronty, wins 100-mile race, defeating Chaney, driving Golden Six.

Indianapolis, Ind., September 8, 1922—A. Davidson, driving Fronty, wins 100-mile race, Hoosier Speedway; Joe Huff, driving Fronty, second.

Paris, Ill., September 5, 1922—A. Davidson, driving Fronty, wins time trials, 20 and 50-mile races; Johnson, driving Fronty, second.

Chicago, Ill., October 21, 1922—A. Davidson, driving Fronty, wins National Pure Championship Race at Hawthorn track against all star drivers of middle west, earning the title of National Pure Champion.

Chicago, N. A. Auto Grand Prix, July 4, 1922—George Pack, driving Fronty, wins 10-mile light car race; 10-mile free-for-all; Louis Schaeffer, driving Fronty, second.

Tomball, Cal., July 25, 1922—Frank Lockhart, driving Fronty, wins 10-mile race. Time: 4.50. Fastest time in the west 20 one-half mile hot race.

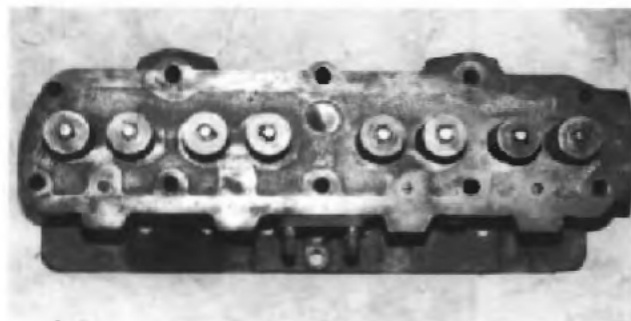
Hoosier Speedway, Indianapolis, Ind., September 8, 1922—A. Davidson, driving Fronty, wins annual 100-mile sweepstakes; Lawwell and Broderick, second and third in Frontenacs.

Graham, Texas, October 8, 1922—Dick Callahan, driving Fronty, establishes world's record, turning two laps on one-half mile track in 55 seconds.

Springfield, Ill., November 18, 1922—Walter Shaw, driving Fronty, wins 15-mile race. Time: 21.4. Martin Stiering, second in Fronty.

Naples, N. A., Canada, 1922—Clio Barlow, driving Fronty, won Midnight Sun Sweepstakes Race, only race in world held at midnight, defeating seven other cars.

MODEL S-R FRONTENAC



The S-R Fronty is 5 inches wide at the top, and seven inches wide at the bottom.



The left side of the Fronty Model S-R has two intake ports and a single set of 18mm spark plugs.



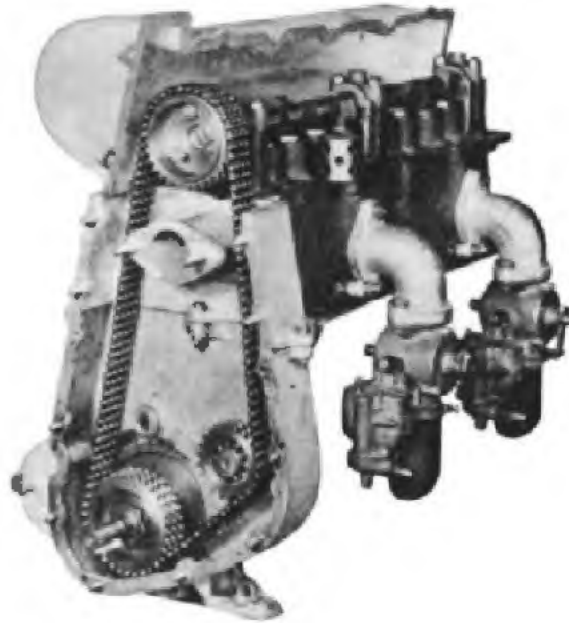
The right side of the S-R has three exhaust ports and a second set of 18mm spark plugs. Note the four-stud mounting on the center port.

The S-R Fronty was introduced during the spring of 1923. The Chevrolet Brothers prepared a T engined car for the 1923 Indianapolis 500. Driven by L. L. Corum, it placed fifth, for the best showing of a T Ford at Indy.

The S-R has two intake ports on the left and three exhaust ports on the right. The S-R also has two 18mm

spark plugs per cylinder, one on each side. In this writer's opinion, this is the most desirable Fronty of all. With either the rocker arm setup, or the single overhead camshaft which was available sometime after February 1927, it was the most trouble free and could stay with the best.

Overhead Camshaft and Drive for Model "R" and "S-R" Frontenac Cylinder Heads



This remarkable outfit was designed and built by us at the insistent demand of many of our customers, users of Model "R" and "S-R" racing heads. It has many advantages over the old rocker arm system. It is simpler, more reliable, more efficient in every way and will add considerable speed to a racing motor, equipped with either cylinder head.

By eliminating the rocker arms, it is possible to turn the motor up much faster than before and this allows the use of a supercharger if desired. Just note these facts: the size of the camshaft, 1 1/2 inches does away with all bending and flexing of camshaft, which is a common complaint when using old style camshaft, thereby securing full opening of valves, thereby increasing speed of motor. The contour of the cams is such as to give a very smooth valve operation, avoiding valve and valve spring breakage. The valve operating cups are free to rotate in guides, thereby distributing wear evenly and insuring long life, beside doing away with usual trouble of guide pins coming loose. The whole outfit is oil-tight, the camshaft and valve cups operate in a bath of oil, with a drain hole at front. It will speed up your motor, make it more reliable and better looking.

Following is a brief description and list of specifications on this outfit.

Camshaft: 1 1/4" diameter, hollow for force feed oiling to all cams and bearings.

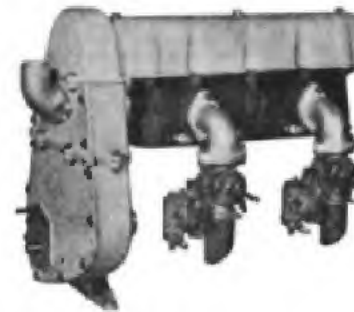
Valve Opening: 3/4" after allowing for clearance.

Valve Cups: 1 1/4" diameter, hardened and ground, free to rotate.

Main Bracket: Cast Iron, valve cup holes reamed accurately, bolt holes to match cylinder head.

Drive: Triple strength Diamond Silent Chain with adjustable idler.

Housings: Aluminum castings, sandblasted to a siken finish.



No. 101: Complete overhead camshaft and drive with housings, ready to install\$200.00

No. 102: Complete overhead camshaft and drive with model "S-R" cylinder head, carburetor, intake and exhaust manifolds\$400.00

No. 103: Complete overhead camshaft and drive with model "R" cylinder head, carburetor, intake and exhaust manifolds\$350.00

No. 104: Complete overhead camshaft and drive with model "S-R" cylinder head only, no equipment.....\$325.00

No. 105: Complete overhead camshaft and drive with model "R" cylinder head only, no equipment.....\$200.00

Special Fronty Crankcase for Sliding Gear Transmission

This special crankcase and fly wheel housing was designed and built by us for the express purpose of eliminating the old style planetary transmission and replacing it with the new Model "A" Ford sliding gear transmission and clutch, which, in our opinion, are admirably adapted for the kind of work required on dirt track racing cars. This crankcase will enable the racing car owners to do away with all bands and troubles attached to the old planetary transmission, will give a much easier running and faster motor by doing away with all undue friction in transmission, will enable him to push or tow his racing car anywhere without special tow wheels, insure easier starting, with crank, and many other advantages at a reasonable cost.

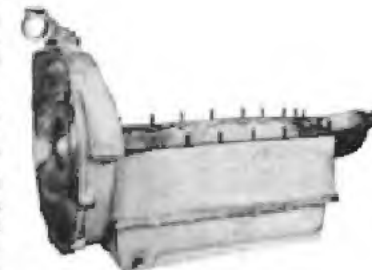
This will also permit running your racing motor on dry sump, feeding cooler oil to the bearings, increasing the life of your motor considerably. This is in keeping with the best and latest practice on racing motors.

Change can be made in a very short time, no machine work necessary.

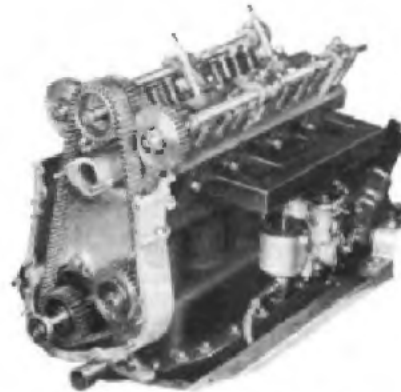
Can be used on any model Ford racing motor, regardless of what cylinder head or crankshaft is used.

No. 701: Crankcase and fly wheel housing assembly, including support arms, steering gear bracket, crankshaft extension, and oil deflector ring\$150.00

No. 702: Crankcase and fly wheel housing complete, same as above and including new Ford model "A" fly wheel, turned down, clutch, clutch housing, transmission, pedals, universal joint, drive shaft, and torque tube, complete ready to install\$250.00



The 16-Valve Fronty Head, Model D-40



16 Valves
2 Carburetors
2 Overhead Camshafts

FRONTENAU 16-VALVE HEAD COVERS REMOVED

The last word in speed and power equipment for the Ford car. In order to satisfy the insistent demand for something still greater, we brought out this new head, which has shown that it is the most powerful ever known in the whole racing world, the 500-mile race at Indianapolis, May 31, 1929. The car equipped with this head went through the entire race and for the last 100 miles was running at an average speed of 115 miles per hour. Since then it has demonstrated its speed and power in numerous races as being better. It has been in more than 100 Ford cars equipped with the Fronty head entered in the 500-mile classic has qualified and finished in the greatest race of the world. The Fronty is the only Ford to have accomplished this.

SPECIFICATIONS

This cylinder head casting is made of the gray iron, and was designed to machined practically all over. The water jacketing of the head has been given special attention, so as to evenly distribute water in every part in the engine, eliminating any chance of overheating, preignition, or any other kind of trouble. Water surrounds the entire combustion chamber, valves, and spark plugs.

The valves, 16 in number, 2 intake and 2 exhaust for each cylinder, are located overhead, and seated in the cooling at an angle of 20 degrees from the vertical. They are 1 1/4 inches in diameter, with a stem 3/8 inch in diameter. Each intake and exhaust valve are of the highest quality. Special valve springs are used and each is held in place by a special nut and washer, which also acts as the valve tappet, upon which the cam strikes, operating the valve. These tappets are held in place by lock nuts. Adjustment between the tappet and camshaft is simple and positive. Each tappet is hardened and ground. Each valve operates in a removable valve stem guide, which may be easily replaced when they become worn. These stems are 1 1/4 inches long, insuring perfect valve operation and timing. The length of the valve guides makes long life.

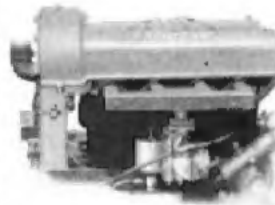
The camshafts 2 in number, are mounted overhead on 5 bronze bearings. These cams are of our special design, and each shaft is made with the same material, and is hollow drilled through the center, with an oil lead to each cam. The entire valve operating mechanism is lubricated by three feed systems, oil being fed through the rear camshaft bearings into the shaft and out of each cam into the tappets and each cam bearing.

The camshafts are driven by a special silent high-speed shaft, 1 1/4 inches wide. This shaft runs from a sprocket on a main shaft, mounted on ball bearings,



EXHAUST SIDE

which takes the position of the oil camshaft, to the upper sprocket, which in turn drives the 2 camshafts. The upper shaft with sprocket, is also mounted on three ball bearings. Special attention was given to the mounting of the camshaft upper drive sprocket, which drives the 2 camshafts. The sprocket and



INTAKE SIDE

drive gear are placed on this shaft, which is mounted to a bronze casting on 2 ball bearings, a third ball bearing being mounted in the drive chain housing, acting as an additional adjusting support. The mounting for the sprocket shaft is cast integral with the 2 front camshaft bearings, forming perfect mesh of the cam gears and alignment of the camshafts at all times. This front sprocket mounting and camshaft bearing casting is bolted solid in the front of the head casting.

The chain is kept in proper adjustment and at the proper running tension by a patented automatic adjusting idler. The entire chain drive mechanism is housed in an aluminum casting, and runs in a bath of oil, supplied by suction oil from the water-jacket feed. Each camshaft is housed in an oil-tight housing, of aluminum, keeping out dirt and oil from all working parts.

The spark plugs are located in the top of the head, firing the charge in the top and center of the combustion chamber, which is the most efficient position. Preignition and fouling of plugs are absolutely eliminated.

There are 4 intake and 4 exhaust ports, each of which is 1 1/4 inches in diameter. These ports are smooth and straight, and give easy passage for incoming and outgoing gases.

The head is designed to give a compression of 125 pounds.

The entire combustion chamber is machined to prevent carbon deposits and preignition from hot spots.

The water jacket is 2 inches inside diameter, and runs through the cam drive chain housing at the top of the head, in the usual plane. The cylinder head uses the regular Fronty gasket, and all flanges (intake and exhaust) take S. A. R. standard gaskets.

Special care was taken in the design of the Frontenau 16-valve head to make all operating parts easily and quickly accessible, and to make this equipment so that it may be installed on any standard Ford block, replacing the stock head, or any of the present overhead valve attachments, now on the market, without any mechanical changes or machine work on the block. The heads may be removed from the block, and reassembled so quickly and so easily as can be done on any head ever designed.

This equipment will instantly appeal to those who have tried other types and makers of heads now on the market, and who desire to equip their car with the most advanced and latest and best of today's design.

TRY THE 16-VALVE FRONTENAU, and you have gone the limit.

We are prepared to furnish special intake manifolds for this head for using either single, two or four carburetors.

The Frontenau 16-valve head is built to order only, and each order will receive the personal attention of Mr. A. Chevrolet, both during course of construction and testing.

Each head is guaranteed against imperfections in material and workmanship.

No. 201—Without intake or exhaust manifolds or carburetors, price \$205.00

No. 202—Complete 16-valve head with exhaust manifold, special double intake manifold and double Zenith carburetor, price \$245.00

Positively no orders accepted unless accompanied by a deposit of 25 per cent of the purchase price.

A Few Records Established and Races Won by Frontenau Equipped With 16-Valve Overhead Cam Head

Winchester, Ind., July 4, 1929—Ralph Grunsky, driving Fronty-Ford, new 16-valve head, won 10-mile free-for-all, featuring world's fastest dirt track race. Time—One-half mile, 21 seconds.

On July 4, 1929—Fronty-equipped cars won at Indianapolis, Milwaukee, Chicago, Minneapolis, Denver, San Luis Obispo.

Katy, Ind., July 25, 1929—Ralph Grunsky, driving 16-valve Fronty-Ford, won both races, establishing new track record for 5 miles. Time: 4 minutes 14 seconds.

Winchester, Ind., September 1, 1929—Ralph Grunsky, driving 16-valve Fronty-Ford, driving Ford Special, 10 match race. Grunsky won 10, 20 and 30 mile races. Time: 10-mile, 9 minutes 48 seconds; 20-mile, 11 minutes 11 seconds; 30-mile, 17 minutes 15 seconds. George Block, driving 16-valve Fronty, scored in each event. Fronty-Ford won all three places in all events of the day.

Duquoin, Ill., September 21, 1929—Ralph D. Grunsky, driving 16-valve Fronty-Ford, won state trials. Time: 12 seconds, establishing new record; also won 1 and 10 mile race 12 record time.

Chicago, Ill., Katy Track, October 11, 1929—Ralph D. Grunsky, driving 16-valve Fronty-Ford, won 100-mile Madison Championship Race. Charles Kinsley, driving Ford, second; Wilbur Shaw, driving Fronty-Ford, third. Time: 1 hour 36 minutes. Don's team, driving Fronty-Ford, won 5 mile consolation race.

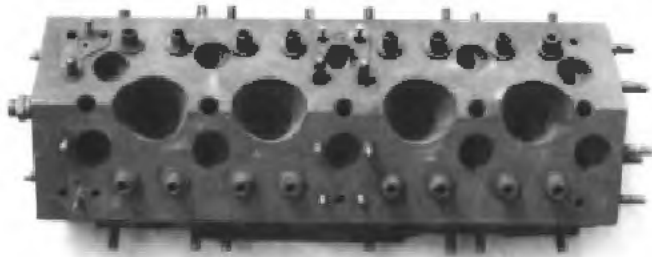
Ascal, Maryland, Lee Stadium, Cal., November 1, 1929—Ralph D. Grunsky, driving 16-valve Fronty, won feature race, establishing new record for 1/4 mile track. Time: 8 minutes 16 2/3 seconds.

San Jose, Cal., March 15, 1929—Jack Patterson, driving 16-valve Fronty, won 10 and 20 mile race on 1/4 mile track. Time: 10 laps, 5 minutes 3 seconds; 20 laps, 11 minutes 11 seconds. Respectively, driver Fronty, won second place in both events.

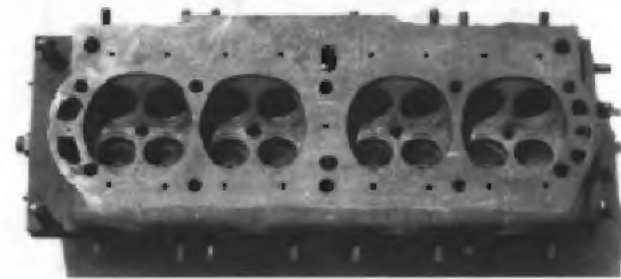
San Francisco, Cal., March 26, 1929—Jack Patterson, driving 16-valve Fronty, won 24 mile race on Tasfaronville dirt track. Time: 1 hour 36 1/2 minutes.

Because they themselves have driven racing cars for a score of years, Arthur and Louis Chevrolet realize the necessity of quality, uniformity and strength in every part of a racing machine. Right tests are given every Fronty product before it is placed on the market, and close inspection is given every piece before it leaves the factory.

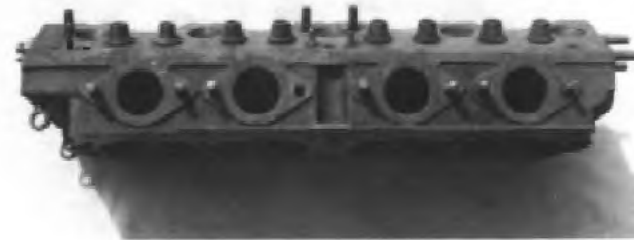
A handling charge of 10 per cent will be made on all merchandise returned for credit. Do not return any material without our consent.



The left side of the 16-valve D-O Fronty has four intake ports.



The right side has four exhaust ports.

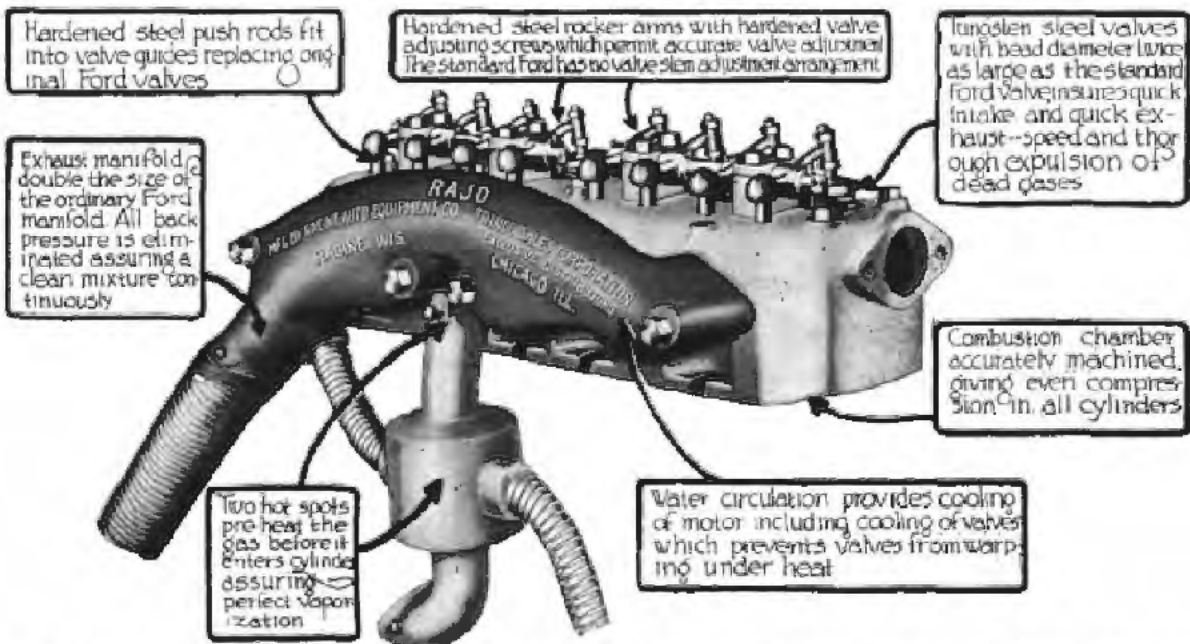


The 16-valve Fronty head, Model D-O, was introduced in 1924. The first real test was, again, Indianapolis. Three Fords had been entered; one with the new D.O. 16-valve head. They were outclassed but did finish 14, 16, and the D.O., 17th place.

This model Fronty is the dream machine of the '20's.

Every young man building a hot T believed that with a 16-valve Fronty he could rule the world.

In its assembled form, with the gleaming polished aluminum cam covers, it is one of the most impressive sights in all the world. It was to set a lot of records in the next half-dozen years.



DEALERS—HERE IS A REAL JOB THAT SELLS AT THE RIGHT PRICE—AND OFFERS PROFITS THAT ARE RIGHT

In perfecting the RAJO every peculiarity and feature of the Ford engine design was taken into consideration. It meets every requirement of the present day low-grade fuel, and increases the motor's flexibility under all operating conditions. The RAJO construction assures complete combustion, and reduces carbon accumulation to a minimum.

The RAJO valve in head type of motor secures a maximum operating efficiency from the Ford motor, and has proven its superiority for ease and quietness of running, speed, and acceleration, exceptional power, quick pick-up and real economy in gas.

Nothing need be done with the present Ford

engine, except to remove the head, and install the RAJO in its place. All fittings are interchangeable with the standard Ford head.

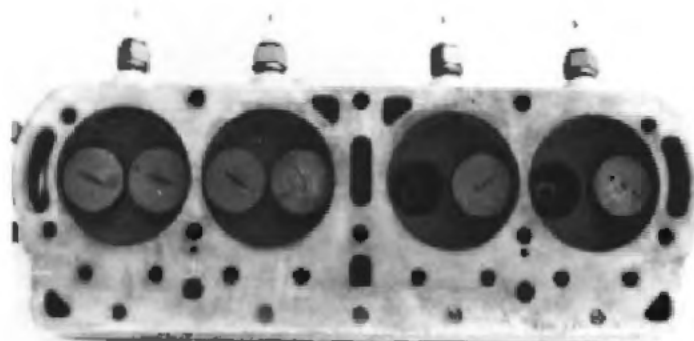
The RAJO makes starting easy in all kinds of weather, and the motor can be throttled down to from 3 to 4 miles an hour on high. Due to the extraordinary power, hills can be negotiated with perfect ease.

Every Ford car owner in your territory is an interested prospect. You can make big money selling the RAJO. We positively guarantee to refund the purchase price to anyone not entirely satisfied with the RAJO after it has been given a 10 days trial. Write for full particulars today.

Jobbers— Write for Complete Details.

Trindl Sales Corporation — 61 E. 24th St. — Chicago

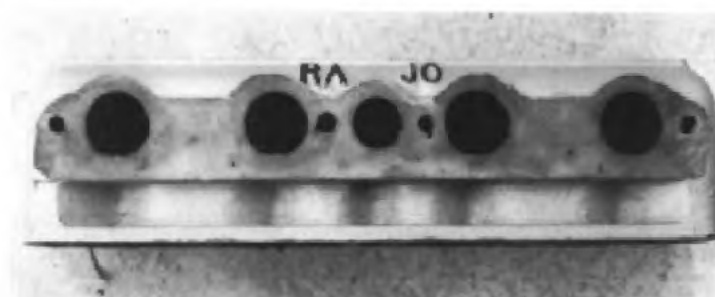
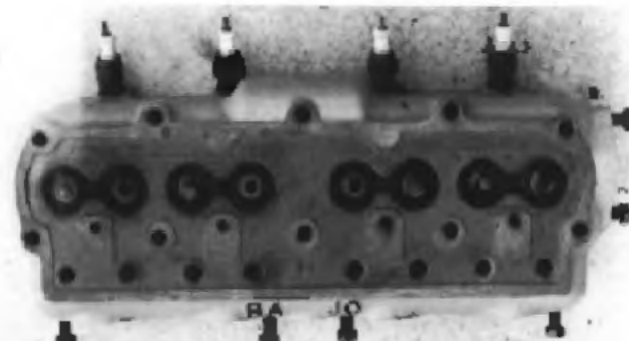
EXCLUSIVE DISTRIBUTORS



The Model 30 has a single set of 1/2-inch pipe thread spark plugs on the left side.

The original model of the RAJO head became known as the Model 30. It has a single intake port and four large exhaust ports, all on the right side of the head. A single set of 1/2-inch pipe thread spark plugs are on the left side.

While this was the original model, when improved models came out this was referred to as a commercial or truck head.

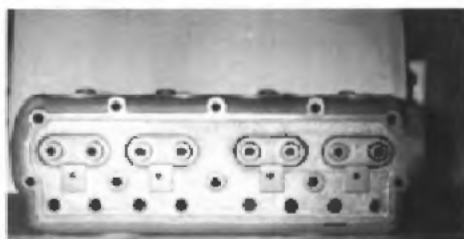


The right side has all the ports; Four large exhaust ports and a single intake port in the center.

The first heads did not have the hot-spot bump on the left side, and the top of the head was round like the top of a loaf of bread. McVean and McVean, of Indianapolis, made an aluminum cover to fit the RAJO.

Care should be taken as this head is passed off at times as a Model C RAJO. Same number of ports but different functions. The Model 30 would not perform as well as the Model C.

RAJO MODEL 31



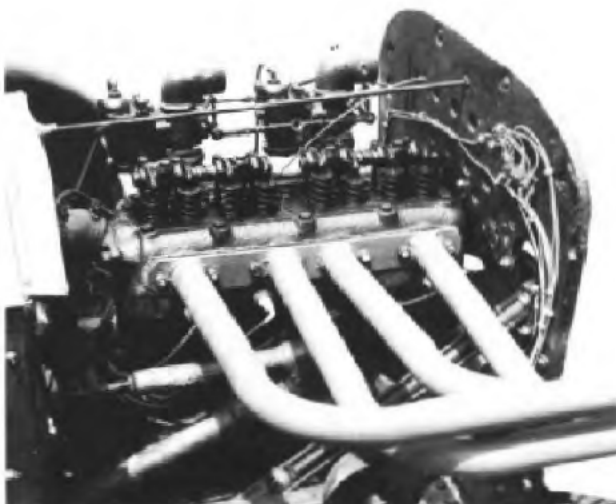
The right side has the two intake ports and a shallow area for a row of short head bolts.

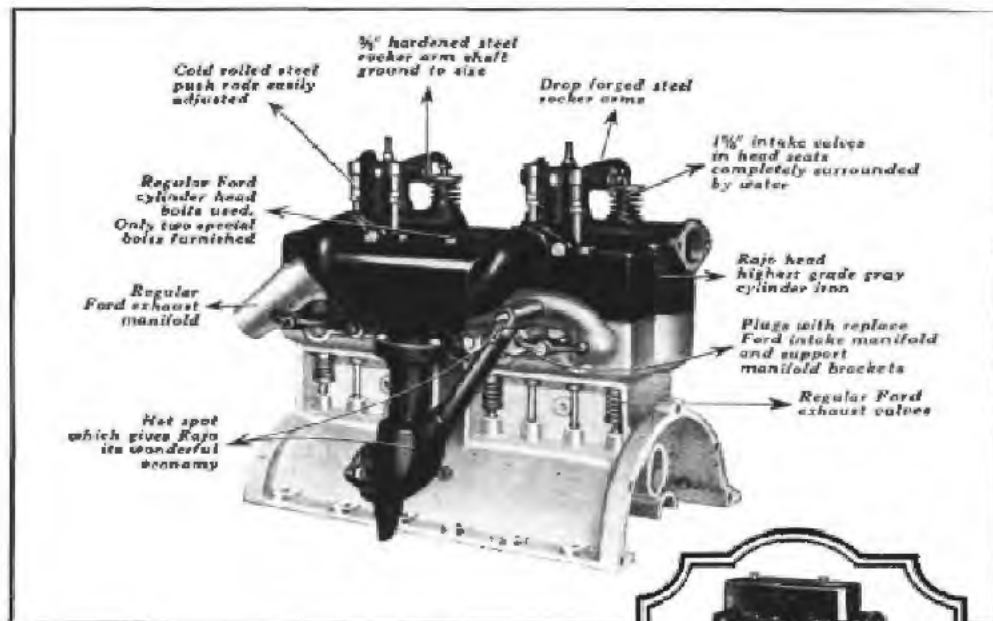
The left side has the four exhaust ports and a single set of 18mm spark plugs.

The RAJO Model 31 was introduced late in 1920; the first of the cross-flow heads. This is the head used by Noel Bullock in his 1922 Pikes Peak run for the championship.

The copy of the advertisement was supplied by Noel Bullock's daughter. Bullock received the ad when he ordered the head. Of the several Model 31 heads I have seen, I have never seen one with spark plugs on the right side as shown in the advertisement.

This model was discontinued when the Model B RAJO came out in early 1924.





Note These Rajo Features

An increase of from 8 to 14 horsepower; a speed of 60 miles an hour with a standard gear ratio; a pick-up from 5 to 40 miles in 14 seconds and an average mileage of 25 miles to the gallon of gas. This is what the super power of Rajo will add to your Ford.

Puts Your Ford in the Big-Car Class

The new "Model A" Rajo Valve-in-Head puts your Ford in the big-car class. With it you will know the joy of shooting up the steepest hills in high gear without pounding or heating; of pulling through deep sand, mud or snow with ease; of passing bigger, far more expensive cars on the open road; of having at your instantaneous command all the speed and power you will ever need.

Simple — Easily Installed

The new "Model A" Rajo Valve-in-Head is the simplest Valve-in-Head attachment ever invented. It has one-half less parts and can be installed without mutilating the car in any way.

Order Now — Be Ready for Summer

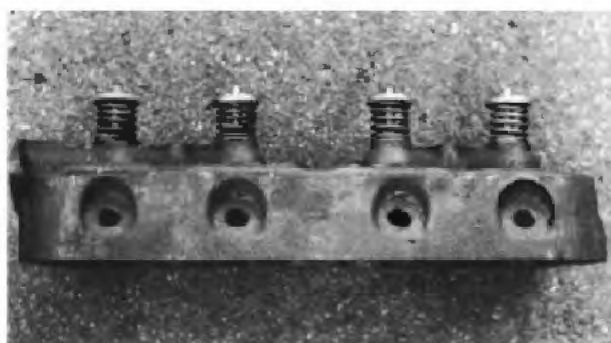
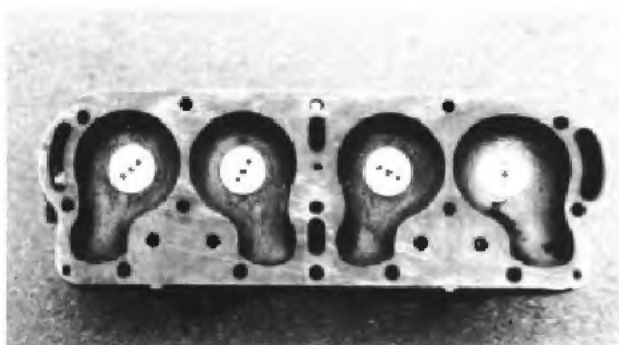
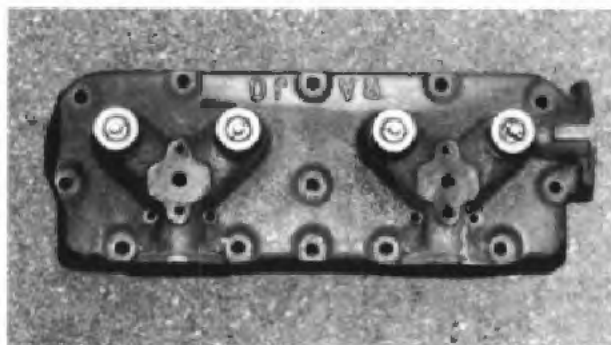
Place your order for the "Model A" Rajo now and be ready for the Summer tourist trails. Only in this way can you be assured of getting one in time.

RAJO MOTOR COMPANY
1354 Racine Street RACINE, WISCONSIN



Rajo is built to provide ample water circulation around its double capacity intake valves. These valves being placed directly over combustion assure Rajo its wonderful power. A controlled hot-spot circulates hot air from the exhaust manifold around intake pipe and carburetor assuring unusual economy. All moving parts are enclosed under an aluminum dust-and-moisture-proof cover. Rajo is a high-grade job in every way.

MODEL "A" RAJO



The left side of the Model A has a single set of standard Model T (1/2-inch pipe) spark plugs.

The right side has two stock-size intake ports.

The "F" head, four-valve RAJO Model A was introduced in January 1923. It has two intake ports on the right, and uses the stock exhaust valves and ports of the Model T block. The head uses stock head bolts with the exception of the two under the rocker arm stands. The Model A is a good head for a speedster but could use larger valves and intake ports. The single valve per cylinder makes this head easy to identify. Spark plugs are 1/2-inch pipe thread.

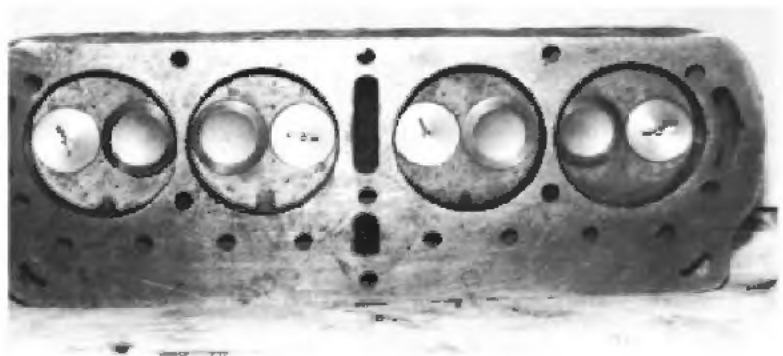
4-Valve RAJO Model A owned by H. D. Thompson, Jackson, Tennessee. Also dual Winfield S.R. carburetors and Splitdorf magneto.



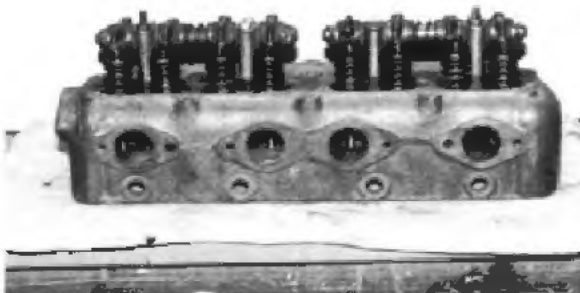
MODEL "BB RAJO



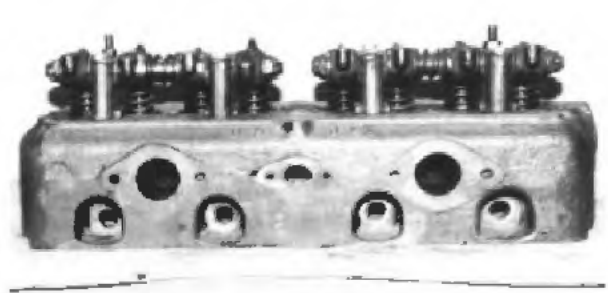
The Model BB RAJO with modern valve springs.



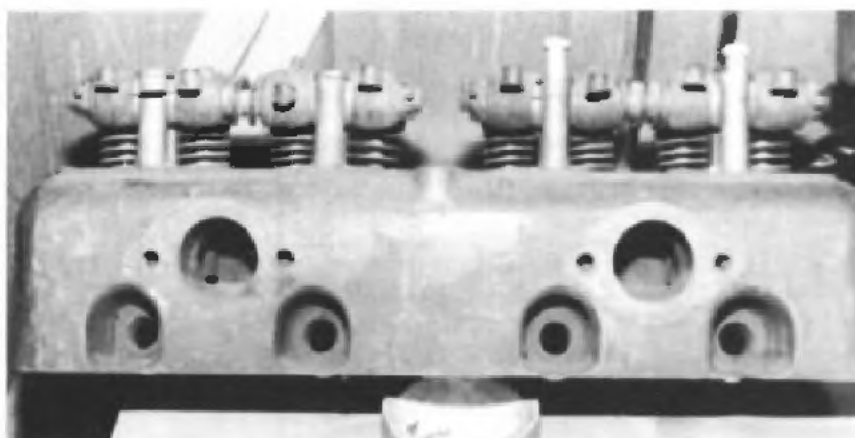
Modern valves are installed here.



The left side of the Model BB has four exhaust ports and holes for a set of 18mm spark plugs.



The right side has two intake ports, and another set of 18-mm spark plug holes.



The right (intake) side of the Model BB-R RAJO. Notice the lack of the exhaust port between the two intake ports.

The Model B RAJO was brought out in January 1924. It, along with the Model A four-valve and the new Model C, was a part of a line of RAJO heads that had something for everyone.

The Model B, the BB and the BB-R all have the same port layout. The Model B has two large intake ports on the right and four exhaust ports on the left. The spark plugs are 1/2-inch pipe (standard Model T) and are located on the intake side. A flat boss is provided on the left side so that the head could be drilled for a second set of spark plugs. The Model BB had the second set of spark plug holes drilled, plus a higher compression ratio.

A competition only model, which I call the BB-R, had the same port layout but did not have the exhaust port (for intake manifold heating) between the two intake ports, and the two intake ports were larger than the Model BB. This was the hottest head RAJO built, and it could hold its own against any of the other brands.

The Models BB and BB-R used 18-mm spark plugs. If you have a head with 1/2-inch pipe threads on one or both sides, you probably have a Model B that has been re-drilled.

In some models of the Model 31, B, BB and BB-R, you might find roller bearing rocker arms. These are like a small rear axle roller bearing. While such an assembly was mentioned in the ads, most of the heads used a conventional bushing in the rocker arms.



The roller bearing rocker arm used on some Model 31, B, BB and BB-R RAJO heads.

RAJO

NEW MODEL C-35

Price \$69.75

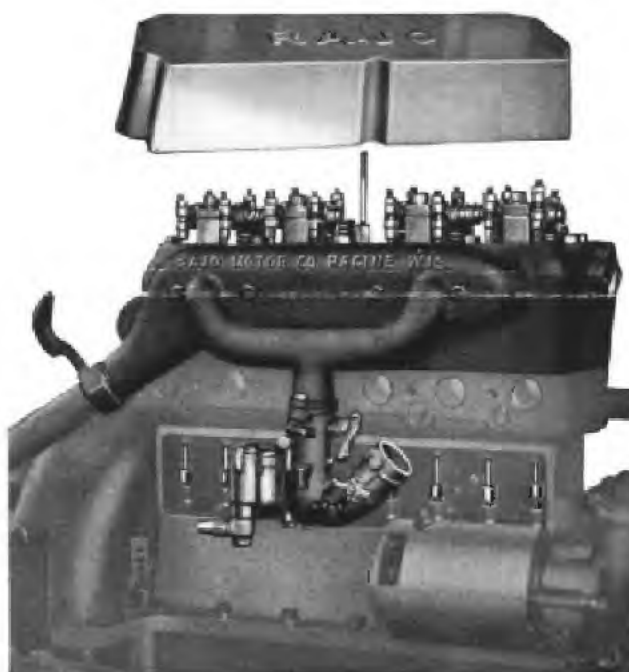
F. O. B. Racine, Wisconsin

More Power

*Quick
Acceleration*

Flexible

Quiet



More Speed

Easy Starting

Economical

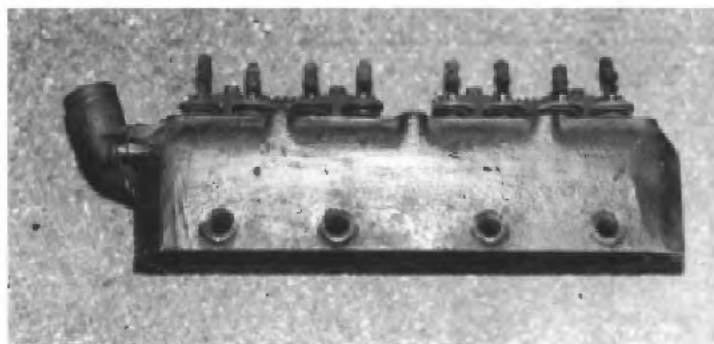
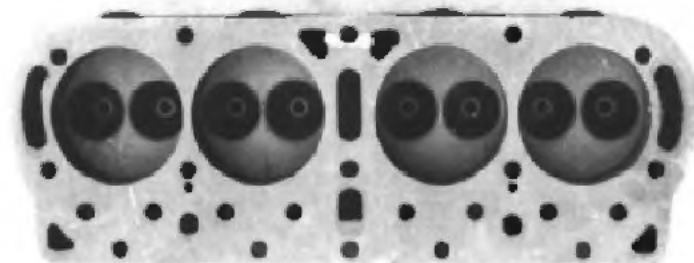
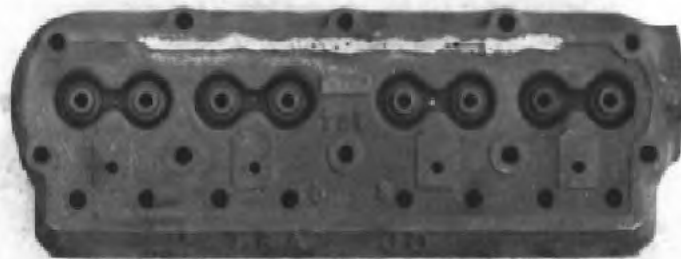
Durable

Think of It!

YOU can have high price car performance with your Ford for only \$69.75. Model C-35 eight Valve Rajo Head, is the result of eight years of manufacturing and engineering experience with overhead valve systems for Ford motors and is a combination of the outstanding features of previous Models. The recent installation of latest types of production machinery only have made it possible to quote this new and low price, making it the lowest priced quality Overhead Valve Equipment on the market today. Don't wait. Place your order today and be assured of prompt delivery.

There is no question that the Ford is the universal Car. The fact that there are more than 10,000,000 Ford users throughout the world—that about one-half of all the cars on American roads are Fords—is proof enough of this. The Ford car or truck goes and gets back. It is simple. It lasts. It costs less to buy, to run, to "keep up."

Now just think back on your Ford driving experience for a moment. How many times have you had to edge to the side of the road as larger, more powerful cars pass by-leaving you in a cloud of dust? Install a new Model C-35 Rajo Head and keep in the lead, on level roads or hills.



RAJO MODEL "C-35"

The Model C RAJO has a single set of spark plugs on the left side.

The right side has two small intake ports and three exhaust ports. Early models had the cut-away section on the side for short cap screws.

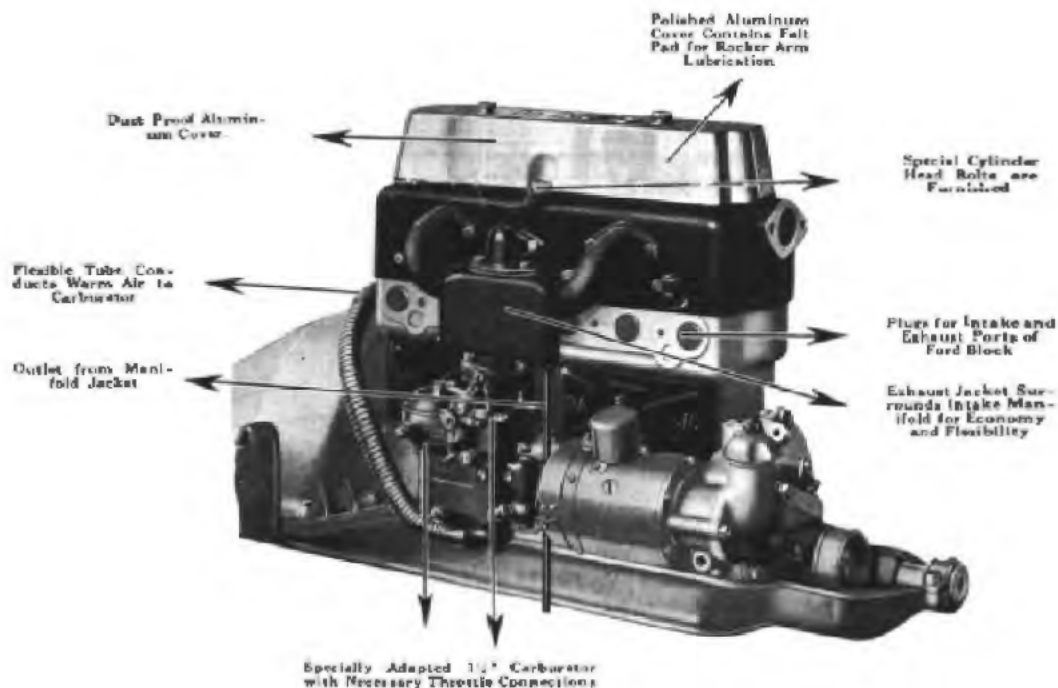
The Model C RAJO was introduced during 1922. It was known as the "Improved Rajo Valve-in-Head." After January 1924 it was known as the Model C. The Model C, along with the Model B and the Model A four-valve, became THE line of RAJOs sold until the end of the Model T Fords.

Model B-8 Valve Head

THE famous Model "B" Rajo Head as shown below is especially designed for Police Departments, Fire Departments, Detective Bureaus and others protecting life and property, who require exceptional speed and power. Ford cars equipped with Model "B" Heads are indispensable for this class of Service.

Price Complete \$100.00

F. O. B. Racine, Wis.



Our Policy

During the many years we have been building Rajo valve-in-head equipment it has been our firm policy to have all owners satisfied owners. We are ready to stand back of any claim or statement we make. Consequently, this policy makes for truth and modesty in our advertising and sales literature.

Rajo Motor Company

Racine, Wisconsin