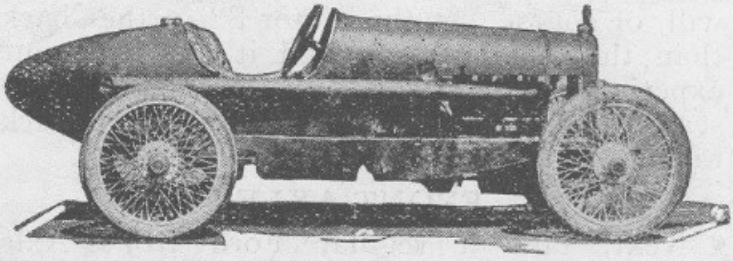
COMPLETE INSTRUCTIONS

FOR BUILDING A

Fronty-Ford Racing Car



BY

A. CHEVROLET

Designer and Builder of the Fronty-Ford. The most sensational performer on half mile tracks up-to-date.

PRICE $2.00

Free to purchasers of Frontenac Cylinder Head or other racing equipment.

HOW TO BUILD A FRONTY-FORD DIRT TRACK RACING CAR

CHAPTER No. 1

FRAME

First, get a standard Ford frame, then to make this car of 88″ wheel base, which we recommend as most satisfactory, cut the side members at a distance of 21″ from the front face of rear cross-member, then shorten this 21″ section of frame to 15″, next insert this in the long-side members, which are tapered, or, in other words, telescope the 15″ length in the main part of frame, then clinch this into place with a few rivets. Next, get an extra front cross-member and rivet this on the front part of frame 8″ back of original front cross-member (this 8″ is from center to center of each cross-member) but do not disturb the standard front cross-member, as the front spring fastens to this original cross-member in the regular manner, the added cross-member carries the front motor support. This will, of course, set the motor 8″ further back than the standard car, and it has been our experience that this is necessary in order to secure a properly balanced car for dirt track racing.

FRONT AXLE

Next, take a regular Ford front Axle I-Beam, cut this in two at the center, then cut a section 5″ long from the left-half, then weld the two halves together (this welding must be done by a competent welder, with welding rod of approximately same properties as the steel in the axle; this is very important). After axle is welded and joined together, shape two pieces of steel to fit in the channel of I-beam, approximately 8″ long and weld one of these pieces on each side of axle, in channel. This is done to insure against breakage of axle in the weld.

Next, install a pair of our front Underslinging Brackets (see catalogue) which fastens, with the bolts furnished, through the Spring Perch hole in Axle. Next, install special front spring, offset (see catalogue), in the regular way, with standard Ford shackles, then attach front spring to front cross-member in the regular manner with standard Ford spring clip.

Next, install a pair of Radius Rods (see catalogue), the front end of which are drilled for the Underslung Bracket Bolt to go through top and bottom, next bring these Rods alongside the frame and mark the center of hole in

Radius Rod on frame, then rivet a pad, shaped somewhat like a carburetor flange (see catalogue), on each side member of frame, then drill through frame same size hole as in pad, which is 5/8″.

Next, install the Radius Rod Anchor Bolts which are case-hardened (see catalogue), then put on lock nuts and cotter pins on inside of frame. Next, install a set of our special racing Steering Knuckles (see catalogue) in the usual manner. This completes the Front Axle for a car offset 5″ to the left or inside of track which we have found to be of great benefit in taking turns on flat tracks at high speed. This, of course, makes the tread of car 51″ wide.

REAR AXLE (ROLLER BEARING)

The Rear Axle is now next in order. One method of Underslinging Rear Axle is by the use of our special rear Underslung Brackets (see catalogue), which are attached in the following manner. First, remove the Spring Perches, next install Spring Perches in center hole of each Bracket, leave these loose until Brackets are in place, then install Bracket using large Bolt to fasten Bracket in place where Spring Perch was located originally, the front end of Bracket then rests on Radius Rod. Next, drill a 3/8″ hole through Radius Rod to register with hole in Bracket, put Bolt in place and tighten. Next, turn Spring Perch in perpendicular position but upside down, install Spring Shackles and fasten to rear Spring, let weight of car rest on Spring and then tighten Spring Perch Nuts as tight as possible and put in Cotter Pins.

When a more substantial or stronger construction is desired in the Rear Underslinging for Racing Car, proceed as follows: Dismantle Rear Axle completely, then take right side Axle Housing first and remove all brakes and connections, remove Roller Bearing and Sleeve, remove Spring Perch. Next, cut off Rivets which hold Brake Flange in place, drive Rivets out, then remove Collar on inside of Axle Tube. Next, press Brake Flange off Axle Tube, then turn Flange one-quarter of a turn forward so as to bring Spring Perch hole in line with Propeller Shaft. This brings Brake Lever at bottom of Axle but does not interfere with the proper working of the Brake. Then press Flange back as far as it originally was, drill new holes in Axle Tube, place Collar inside of Axle Tube and rivet Flange on Axle Tube. Next, install Rear Spring Perch in perpendicular position, facing upwards as before and tighten in place. Next, take Radius Rod and spread same just enough to allow it to clear Spring Perch. Use the

hole, which was originally the top hole for Radius Rod, as bottom hole, insert Bolt and then drill new top hole for Radius Rod, reassemble brake levers and connections, replace Bearing and Sleeve and Dust Cover and Felt Retainer.

Now, for the Left Side Axle Tube, proceed in same manner as above, except that when Brake Flange is removed, cut off 5″ of Axle Tube, machine the outside of Tubing to proper diameter to receive Brake Flange and also bore inside of Axle Tube proper size to receive Roller Bearing Sleeve, then proceed as explained above. Replace Brake Flange turned one-quarter turn forward to bring Spring Perch hole in line with Propeller Shaft. Then reassemble as explained above.

Next, take Axle Shaft and cut off 5″ at the differential end, cut new groove for split ring and new Keyway at same distance from the end of Shaft as formerly. This completes the Axle Housings for a 51″ thread car, offset 5″ to the left same as front Axle.

SPECIAL AXLE SHAFTS

Now it is a well-known fact that the standard Ford Axle Shaft is not strong enough to withstand the severe strain put on it in racing cars, especially the right hand Axle, as all the weight of car is thrown on this Axle when taking turns at high speed, causing the Axle Shaft to break. Now, to remedy this condition, we can furnish a special Roller Bearing (see catalogue) with smaller Rollers, which allows the use of a larger Axle Shaft (see catalogue). This new Shaft is 1 5/16″ in diameter where it fits into Bearing instead of 1 1/16″, which is the regular size. Furthermore, this special Axle Shaft is made out of Electric Chrome Vanadium Steel, which is by far the best steel for Axle Shafts. These Shafts are heat-treated and ground to accurate dimensions. When installing these oversize Axles, it is of course necessary to bore out the Wheel Hubs to a larger size. This can be done by any good machinist on a lathe or can be sent in to us and we will do this work at a reasonable figure.

REAR AXLE (BALL BEARINGS)

When it is desired to have the Axle Shafts run on Ball Bearings, which is the construction we use on our own cars and recommend, proceed as follows:

Refer to instructions above at point where Brake Flange has been taken off, then bore out Axle Tube just enough to get a good, smooth hole and about one inch further in than rivet holes. Next, get a piece of seamless

steel Tubing 2½″ O. D. and 1½″ I. D., turn this on the lathe to proper diameter for press fit in Axle Tube and the proper length to reach shoulder in Axle Tube, and shoulder against end of Axle Tube, then press this Sleeve in place, leaving enough of 2½″ Tubing to lengthen Axle Tube ¼″.

After pressing this Sleeve in it may be found that the Brake Flange will not fit over Axle Tube any longer, on account of Axle Tube being expanded by the Sleeve. This is caused by too tight a fit and the remedy is, of course, to take a light cut over the outside of Axle Tube to bring it back to original dimension.

Next, press Flange back into place, as explained above, with Spring Perch hole in line with Propeller Shaft, drill rivet holes in Flange to 9/32″ through Axle Tube and Sleeve, then tap these holes out to 5/16 x 24. Next, countersink holes in Brake Flange, put in Cap Screws and cut these off about ⅛″ above Flange, then rivet them. The reason for not using Rivets clear through is that the heads of the Rivets inside of Sleeve would interfere with the Axle Shaft.

Next, machine the end of Axle Tube and Sleeve to proper diameter to fit snugly a No. 1211 N. D. Bearing (see catalogue). This Ball Bearing is mounted in a special carrier (see catalogue) which bolts against the Brake Drum using same Bolts. It is necessary, however, to cut a slight recess in Brake Drum approximately 1/32″ deep of the exact diameter of this carrier, so that the load will rest on the shoulder of this recess and relieve the load off the Bolts. This construction also includes the use of the large Axle Shafts.

PROPELLER SHAFT AND HOUSING

Next in order, to determine the length of Propeller Shaft and Housing:

Install the standard Ford Crankcase in frame, the front end resting on motor support fastened on second front cross-member, then drill new holes in frame to match holes in rear motor supports.

Next, take Universal Ball Cap which fits into end of Crankcase. We recommend our special Ball Bearing Ball Cap (see catalogue) for this purpose. Bolt this on Crankcase in the two lower holes of Cap. Next, mount the regular Propeller Shaft and Housing on Rear Axle. Next, install rear Spring in rear cross-member in the usual manner with regular Ford rear Spring Clips, but upside down, that is, with the nuts uppermost. This is done in order to get more clearance over rear Axle. In order to keep these from slipping sideways, it

is necessary to drill the plate which is now on top and put in a pin to fit in hole in cross-member.

When building offset car it is necessary to use our special rear Spring (see catalogue). Next, bring the ball end of Propeller Shaft Housing against Ball Cap which is fastened on rear end of Crankcase and assemble this in place, that is, put Bolts through both halves on Ball Cap and tighten Bolts. Next, make sure that Propeller Shaft Housing is exactly parallel with frame side members, then measure the distance from rear Spring on frame to Spring Perch on Axle, that is the exact amount the Drive Shaft and Housing will have to be cut off. For a car with 88" wheel base this measurement should be approximately 25½".

To shorten Propeller Shaft and Housing, proceed as follows: After measuring length to be cut off, carefully, as explained above, mark off this same distance on Propeller Shaft, from the front or universal joint end, then saw Shaft at this point. Next, machine Shaft to same diameter as formerly to fit Bearing in Propeller Shaft Housing, and mill new square on end of Shaft.

Next, cut Propeller Housing at a point about 4" from rear end, then mark the same distance on front part of Housing as was cut off drive Shaft, approximately 25½", and cut this off. Next, bore both halves of Housing just enough to get a good, smooth hole to a depth of about 6" in each half. Next, take a piece of steel Tubing of 2" O. D. and 1⅝" I. D., turn this on lathe to exactly the same diameter as hole in Housing, then heat housing to about blue heat and insert smaller Tube to depth of 4", then cool off. Next, heat other half of Housing to same heat and insert other end of smaller tube, taking care that Radius Rod eyes in front end of Housing are in the same relative position to holes in base of Housing as before cutting.

Next, weld at joint through to smaller tubing. Next, install Shaft and Bearings in Housing, mount pinion on Shaft, then hold Housing upright, with pinion resting on floor, then place universal joint in place and be sure that it is in as far as possible and resting against babbit Bearing in Housing. Next, mark hole through universal joint on to Shaft for pin which holds universal joint in place. Next, dismount Shaft from Housing and drill hole, same size as was in end of Shaft originally, then reassemble rear axle. Next, take Radius Rods, cut these at a point about 12" from rear or split end, and if other instructions in regards to wheel base have been followed, cut a piece off towards front end about

22" long, flatten this out and telescope in short rear piece to proper length to fit on Axle, then put in two small Rivets to clinch this in place and weld at joint.

GEAR RATIO

Just a few words here in passing in regards to gear ratio. It has come to our notice that many drivers who are entering the racing field have the notion that by installing a higher gear ratio, such as 3-1, they will be able to derive greater speed from the car. While this may be the case where all running is done on long stretches of road, the exact opposite is the case in dirt track racing. In the up-to-date racing car which has a small motor, all increases in power devolped have been due to higher engine speeds, the smaller the motor, the higher the engine speed. It, therefore, stands to reason that after altering the motor design so that engine speeds of 3500 to 3800 are possible instead of 1800 or 2000, it would be folly to also increase the gear ratio, which, provided that engine could pull this high gear ratio and attain this high engine speed, would give the car a speed of 100 miles per hour or more. Now it is a well-known fact that it is practically impossible to use a speed of more than 70 miles per hour on any half-mile dirt track, so then the logical thing to do is to install a lower gear ratio which will give a speed of approximately 70 M. P. H. at full engine speed, the benefit of this low gear ratio is most apparent when car is rounding the turns, and picking up speed on the short stretches, the car with the low gear ratio will gather speed much quicker than the car with the high gear ratio and will easily outdistance it on half-mile tracks. For this reason we recommend that a 4-1 gear ratio be used for half-mile tracks. This is done by simply substituting a 10-tooth pinion for the 11-tooth pinion, which is the standard Ford pinion. Any Ford dealer can supply this. For mile tracks we recommend that the standard Ford gear ratio be used which is 3.63-1. When it is desired to make speed trials on a straight-away course a mile or more in length, without any turns, the 3-1 gear ratio is recommended.

WHEELS

Next in order we now come to the wheels, a very important factor in any racing car. No one should ever attempt to drive a racing car equipped with wood wheels, as they are not strong enough to withstand the severe strain put on them when taking turns at high speeds. Some favor the disc wheels, but we do not recommend them on account of their weight

and they also are liable to collapse on half-mile tracks due to the heavy bending stresses they are subjected to repeatedly. This will eventually cause wheel to break at the Hub. The safest wheel for dirt track racing is the wire wheel, as it is stronger and lighter than either of the above types. After numerous experiments we have, in connection with a wire wheel manufacturer, brought out a wire wheel which we believe is ideal for this purpose (see catalogue).

TIRES

Next, we come to the matter of tires. For dirt track racing, nothing but the best will answer the purpose, as your life depends on your tires. Several tire makers are making special tires for this purpose which we can honestly recommend (see catalogue).

STEERING

Next in line, we come to the Steering Gear, a very important item also in the construction of a racing car. We do not recommend the use of the regular Ford Steering Gear, as it is not substantial enough for this purpose. We recommend a special Steering Gear, very light and very strong (see catalogue). This Steering Gear is mounted on the frame by means of a Bracket which is furnished with Steering Gear, the drag-link or Connecting Rod is also furnished with the Gear. We are now ready for the Motor.

MOTOR

First, get regular Ford Crankcase, regular Ford Cylinder Block (starter type), some prefer to have the new Block ground to secure smoother finish, but our opinion is that the finish on the regular Block is entirely suitable for racing purposes. On account of the enormous power developed by the use of our Frontenac Cylinder Head (see catalogue), the regular Ford Crankshaft or any other Crankshaft of same size, no matter whether it is counterbalanced or not, will break sooner or later and thereby cause great damage to Motor. To overcome this serious weakness we have brought out a special oversize Crankshaft (see Catalogue), which entirely overcomes this defect. Now in order to fit this special Crankshaft to the Cylinder Block, it is necessary to fit larger Bearing Caps (see catalogue) and bore out the main Bearings with new Caps in place to 1¾" diameter, then rebabbit these main Bearings and bore babbit to 1⅝", which is size of Crankshaft on main Bearing Journals instead of 1¼", which is the standard size. The Connecting Rod Journals on this special Crankshaft are 1⅜" instead of

1¼" on regular Shaft, and it is necessary to bore the Connecting Rods to 1½" diameter, rebabbit them and bore out rebabbit to 1⅜" to fit Shaft. The Connecting Rods, which are standard Ford Rods, should be balanced accurately at both ends, that is, all the big ends should weigh the same and all the small ends or pin ends should weigh the same. To accomplish this, proceed as follows:

BALANCING

Secure a pair of accurate scales, such as drug stores use, which balance on a knife edge. Do not use spring scales of any kind. Then let small end of Connecting Rod rest on bench or table at same height as scales, and at proper distance to allow big end to rest on scales. Then determine which Rod is the lightest, taking care that all Rods rest at same distance from scales. After finding lightest Rod, balance scale with weight on graduated bar, then remove as much material off the big end of the other Rods to bring them to the same weight as lightest one. After this is done, proceed in the same manner with the small end and after all small ends and all big ends are evened up, lay the entire rod on the scales and find out which is the lightest. There should not be any material difference, but there may be some and this can be taken care of by removing a small amount of material of the I-Beam section of the rod or drilling small holes in this section at an equal distance from each end. We can furnish these rods all machined out and balanced, bored out to fit either the regular Shaft or special oversize Crankshaft (see catalogue).

FLYWHEEL

The regular Ford flywheel is used but the magneto and field coils are removed and flywheel should be turned to 10" or 11" diameter. Do not attempt to build a racing Motor with the full size flywheel, as there is great danger of this full size flywheel breaking and doing a lot of damage. After turning flywheel to proper diameter, it should be balanced accurately.

PISTONS

Next, fit light Pistons into Cylinder Block, alluminum alloy Pistons are best for this purpose on account of their light weight, as this is a very important factor in regards to engine speed. We have developed a special racing Piston which we recommend highly for this purpose (see catalogue). The Pistons should also be balanced accurately with pins and rings installed, as there may be a slight variation in the weight of the Pistons, or Piston

pins or Piston rings. This balancing of moving parts should be done very carefully, as it has a great bearing on the performance and durability of a high speed engine. All alluminum alloy Pistons should be allowed, approximately, .003 clearance per inch of bore on the skirt of Piston, the Ford Cylinder being 3¾" bore would then require Pistons with approximately .012 of an inch clearance on the skirt. From the Piston head to the third Piston ring this clearance should be at least .006 per inch bore, for a 3¾" bore this would be approximately .024 of an inch.

PISTON RINGS

The rings should be as narrow as possible. ⅛" wide is what we recommend and use in our own cars (see catalogue), for the reason that they seat quicker and also in view of the fact that racing Pistons must have such excessive clearance, that wider rings do not adhere to cylinder wall when Piston goes over center and rocks slightly in cylinder at time of explosion. The wide ring at this period only touches the cylinder wall at the upper edge of ring on one side and at lower edge of ring on opposite side, causing the face of ring to become slightly rounded after a short time and allowing part of the exploded gases to escape down through Crankcase, injuring lubrication and causing overheating and loss of power. While on the subject of Pistons we recommend that better and lighter Piston pins than the standard Ford pins be used, as these are rather too heavy and are liable to break where they are notched for clamp screw in Rod. We can furnish special pins made of better material and of better design for this purpose (see catalogue).

OILING SYSTEM

Next, provision must be made for the pressure feed oiling system. The Crankshaft, as stated before, is drilled from the main Bearings through to the Connecting Rod Bearings Journal, the front main Bearing feeds oil to No. 1 Connecting Rod, the center main Bearing feeds oil to No. 2 and No. 3 Connecting Rods and rear main Bearing feeds oil to No. 4 Connecting Rod Bearing and also through an opening at rear end of Shaft to the transmission Shaft, which is also drilled in the center far enough to allow a small hole to be drilled on Shaft and feed oil to the main transmission bushing.

In order to get the oil to the Crankshaft it is necessary to bring an oil line from oil pump to left side of Motor. This line is ⅜" copper tubing. Then, at a point exactly between

No. 1 and No. 2 Cylinder and 2" above lower edge of Cylinder casting, drill a 7/16" hole and tap ¼" pipe, install a ⅜" Tee with ¼" pipe thread, the part of this Tee which screws in Cylinder Block should be tapped on the inside to ⅛" pipe thread to receive another smaller Tee, which should be ⅛" pipe on one part and ¼" copper tubing on other ends. This smaller Tee is then inside of Cylinder Block. Then run one ¼" line from this Tee to front main Bearing and another line to center main Bearing. Next, drill another hole at a point exactly between No. 3 and No. 4 Cylinders, tap out ¼" pipe and install by-pass regulator, connect this to other Tee, which is already on front end of Block, with ⅜" copper tubing. The part of by-pass which fits into Cylinder Block is tapped out ⅛" pipe, into this opening install ¼" tubing elbow and run oil line to rear main Bearing. There are still two ⅛" pipe openings in by-pass. These openings face toward the rear of Motor. Into the first opening, nearest to Cylinder Block, install an elbow for ¼" tubing and connect this to Oil Gauge on dash. At a convenient place in this line install a ¼" tubing Tee to provide an oil connection to rear Bearing of transmission, as explained in transmission chapter. Into second opening of by-pass, which is the overflow, install an elbow for 5/16" tubing and run a 5/16" line to top of transmission, so placed that the overflow of oil will spray on transmission bands. Next, drill main Bearing Caps in center with 11/32" drill and tap out ⅛" pipe, install elbows for ¼" copper tubing and connect.

Care must be taken to drill these holes in main Bearing Caps so that they will register with holes in Crankshaft, next cut a circular groove in Bearing approximately 1/32" deep to allow oil to reach hole in Crankshaft at all times. The Bearings, with this oiling system must not have any side grooves or flats of any kind such as is the standard practice on regular Ford Bearings, in other words they must be 100% Bearings, otherwise the oil will run out of the sides of the Bearings, throw too much oil in Cylinders, causing Spark Plugs to foul, and not feeding enough oil to Connecting Rod Bearings causing them to burn out or melt. Blue Print for installation of oiling system furnished with complete oiling system. (See Catalogue.)

BEARINGS

All Bearings in Motor should be burned in, but not as much as on standard motors, and then after burning in, shims should be added to give .001" to .002" clearance. Use the regular

Ford Camshaft and Bearings, but we recommend that our special Camshaft Gear, made of nickel steel (see catalogue) should be used, as the regular Ford Camshaft Gear being made of cast iron, with only four spokes will break in a few minutes running at high speed. The end of Camshaft extending beyond threads for nut should be cut off and our Camshaft extension (see catalogue) which drives Oil Pump, and is threaded to serve as Camshaft Gear Nut be installed.

WATER PUMP

Next, install our water-pump and magneto bracket (see Catalogue) which fastens on Cylinder Block (starter type) in place of Generator Gear Housing, this bracket also fastens to the Crankcase at the rear end of bracket by means of two Crankcase Bolts. Next to install Water Manifold it will be noticed that just below the Exhaust Ports in Block there are three Expansion Plugs which can be removed by drilling a small hole through Plug, then insert a small punch in hole and pry Plug out, then lay Water Manifold against Block so the holes in Manifold will match the holes in Cylinder Block and then mark holes in Cylinder Block to receive studs which hold Water Manifold in place, drill these six holes with a 3/16 or No. 10 Drill, and tap out with ¼x20 tap, insert studs and put Manifold in place. Then close original water opening in Block with a suitable plate.

TIMING

The Camshaft should be timed at the same mark which is used for regular Ford Motors, no special timing or special Camshaft are necessary if the Frontenac Head is used (see Catalogue). Next install Magneto, we use and recommend the Scintilla Magneto (see Catalogue) and this should be installed with a suitable coupling which provides means for adjusting the timing of Magneto (see Catalogue). The Magneto should be timed so that, with the advance lever at the full retard position the breaker points opens exactly at the time that the Piston reaches upper center, coming up and before passing center. Any excessive spark advance is of no benefit, on the contrary, it will slow up any motor and specially will retard the pick up of car.

OIL PUMP

Next install front Gear Cover and fasten in place. Next install Oil Pump (see catalogue), the Camshaft extension referred to above comes through this Cover. Next take Oil Pump apart, take out Gears then slip pump

body over Cam extension, next take Gear with Keyway and place this on Shaft, next insert other Gear in Housing and put on Pump Cover, then get Oil Pump body in line with pad on Gear Cover and mark holes through Oil Pump onto Gear Cover then dissemble Oil Pump, take off Gear Cover and drill these eight holes with ¼" Drill, and tap out with 5/16x18 tap, then replace Gear Cover, put Pump body in place, place small Woodruff Key in Cam extension, install Gear with Keyway, next install second Gear, taking particular care that parts are absolutely clean, put Oil Pump cover in place and fasten with eight 5/16 Cap Screws furnished with Oil Pump. Then make necessary connections from Oil Pump to connections in the side of Cylinder Block to feed oil to Crankshaft. Next install Sub-base oiler (see Catalogue) which fastens to underside of Crankcase in the place of regular Ford inspection plate, it will be noted that at the rear of Sub-base oiler there is a piece of ¾" pipe which projects about 1½", mark a space on flywheel housing to correspond with this pipe, drill hole large enough for ¾" pipe and weld a short length of pipe in this Housing, replace Sub-base oiler with Gaskets and connect both pipes with a short piece of radiator hose, next connect opening at side of Sub-base oiler to right side of Oil Pump.

TRANSMISSION

The regular Ford transmission is used, the only change necessary being to drill hole in center of main Shaft and small hole to register with bushing in order to Oil transmission properly. Drill also another hole in Shaft to throw oil on triple Gears, these holes should be drilled with a No. 55 Drill, the regular Ford bands are used. It is advisable to balance the transmission with the flywheel as a unit.

The overflow opening in by-pass regulator included in oiling system should be connected by a 5/16" tubing to transmission cover and placed so as to spray oil on transmission bands. The other opening on by-pass should be connected to Oil Gauge on Dash by means of ¼" tubing. At a convenient place in this line a Tee should be installed and a line run from this to the rear transmission Bearing and Ball Cap. The opening in the connection fastened to transmission cover should be plugged with solder and drilled with a No. 60 Drill, otherwise too much Oil will be fed in this Bearing, in to universal and rear Axle.

CYLINDER HEAD AND CARBURETOR

Next install the Frontenac Head Model R (see Catalogue) install special racing Carbu-

retor (see Catalogue) with Intake Pipe. On the air Intake opening of Carburetor we advise that a piece of flexible tubing be fitted long enough to come through Dash Board, cut hole in Dash to accommodate this. There are two reasons for using this tube, the first one is that on dirt tracks especially, there is so much dust that a considerable quantity of dust is taken into the Motor while running, this dust acts as an abrasive and causes very rapid wear on all parts of Motor. By taking this air from the Dash, the amount of dust is reduced considerably. The second reason is that the Motor will pick up better after shutting off with this tubing in place owing to the column of air moving in this tube.

Next install special racing Exhaust Manifold (see Catalogue). Install transmission cover, taking care that there should not be any oil leaks, adjust bands, and install transmission cover door. Next install starting crank extension (see catalogue) and drive pin through hole which originally held fan pulley pin. Install Motor in frame and fasten in regular manner. When Head is installed the bolts which hold Head on Cylinder Block should be pulled as tight as possible, and the Valve Push Rods should be given about .020 of an inch clearance after running Motor a short length of time, just enough to warm up. The Cylinder Head Bolts should be tightened again and Valves adjusted to .020 of an inch clearance for the Intake and .015 of an inch clearance for the Exhaust. Before starting Motor, it is necessary to prime Oil Pump, this is done by removing the top connection on the Oil Pump and filling pump and line with Oil, put connection back in place before starting Motor. It is also necessary to prime Oil Pump every time the Oil is drained out of Crankcase.

BREATHER TUBE

It is also necessary to install a Breather Pipe on Cylinder Block, preferably on front left side, which is also used as an oil filler. (The Breather Pipe of the Chevrolet or Oldsmobile Motor is suitable for this purpose.) When new Motor is built, it should be filled with a generous supply of common light oil and run about half hour, then this should be drained and Castor Oil or other good heavy cylinder Oil put in. For racing we recommend the use of Castor Oil only as it is the best lubricant known, such brands as Oilzum, Owl Cold Pressed or Baker A. A. A. are entirely suitable for this purpose.

RADIATOR

Next we come to the Radiator, the regular Ford Radiator can be used with the addition

of a special shell, which is streamlined to decrease wind resistance (see Catalogue), but for the best results we recommend our special Raditor (see catalogue) which is much more efficient, the Radiator should be mounted directly over the second or extra cross-member and fastened in the usual manner.

BODY

Next we come to the Body. While it is true that some cars are being driven on race tracks without any Body outside of a seat fastened to the frame, we do not approve of this as this is very dangerous, for the reason that any bumps on track, or tire blowout will jar the driver off his seat and very likely cause him to lose control of his car, causing an accident which may result in serious injuries to himself and other drivers. When car is equipped with a substantial Body (see catalogue) the driver becomes, in a manner of speaking, part of the car, and is able to control his car much better and easier. This is a very important point in winning races. This Body should be equipped with a double tank behind driver's seat, one part of tank for Oil and larger part of tank for Gasoline.

OIL AND GAS PRESSURE FEED

It is imperative that gasoline be fed to the Carburetor under pressure, as gravity feed will not supply Carburetor fast enough at high speeds. The oil should also be fed in Motor, when required, under pressure. It is, of course necessary that the Caps on these tanks be air tight (see Catalogue). The gasoline line from tank to Carburetor should be 3/8" copper tubing, well supported along the frame and equipped with shut off Valve easily accessible, and cut at a convenient place near Carburetor and joined together with a piece of good rubber hose, this is done to stop vibration which would eventually cause copper tubing to break. On the Dash Board of Body a hand pressure pump (see Catalogue) should be installed, within easy reach of driver, then a short line of 1/4" copper tubing run from Pump to a "Tee" then from each side of "Tee" run a separate 1/4" tubing to gasoline tank and one to oil tank. In the line which runs to the oil tank a shut off Valve should be provided within easy reach of driver in order that air pressure can be cut off the oil tank when oil tank is empty, otherwise, when oil tank is empty the air pressure from gasoline tank will escape through oil tank outlet.

The outlet pipe from oil tank to Motor should be of rather large size, we recommend at least 1/2" pipe and should be provided with

a Valve within easy reach of driver so that when Oil Gauge on Dash begins to give indications that Oil in Motor is getting low, a fresh supply can be allowed to run in Motor at once without stopping car or Motor. There should also be mounted on Dash an oil pressure gauge which will register at least 75 lbs. pressure (see catalogue) and an ir pressure gauge which will register 10 lbs. (see Catalogue). While racing a pressure of 3 to 4 lbs. should be maintained on gasoline tank, for road work 1 lb. is sufficient.

STEERING WHEEL AND CONTROLS

The steering post bracket (see Catalogue) should then be fastened to Dash Board in the most convenient position to suit the driver of the car, with steering wheel in place. This wheel should be of the best material obtainable, we recommend the use of our special spring-steel spoke steering wheel (see catalogue) as it eliminates all danger of driver being injured by the spokes of steering wheel, as is often the case in accident. The Ignition Switch should also be mounted on dash as well as the Spark Advance control. A regular Carburetor control or Dash adjustment is entirely suitable for this purpose.

A Motor-Meter should be installed on Radiator Cap and this should be watched very closely while running, on account of the fact that any sudden rise in the temperature of the Motor is a sure indication of trouble, either lack of lubrication, lack of water in cooling system or faulty timing of Ignition. A lean mixture in Carburetor will also cause overheating.

SHOCK-ABSORBERS

Shock Absorbers should be installed on any racing car as they protect the car from severe shocks and are a great help in controlling car at high speeds.

A car built according to these instructions and equipped with our Specialties will easily negotiate any good half-mile track in 30 seconds or less if track is banked. It will negotiate a mile-track in 46 to 50 seconds, according to surface and turns on track. On straightaway racing, equipped with 3-1 or 2¾-1 gear ratio it will attain speeds of 100 M. P. H. and over. It will run consistently and should be a consistent winner in any dirt track race meet.