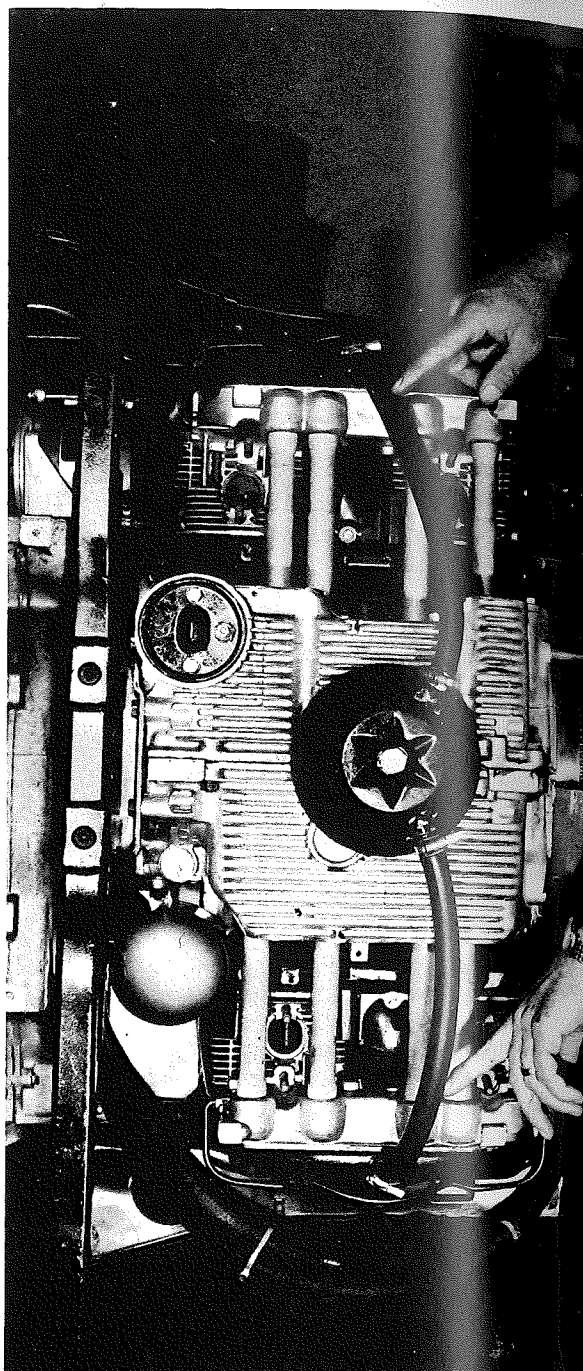


# Preparing the Porsche 914-4

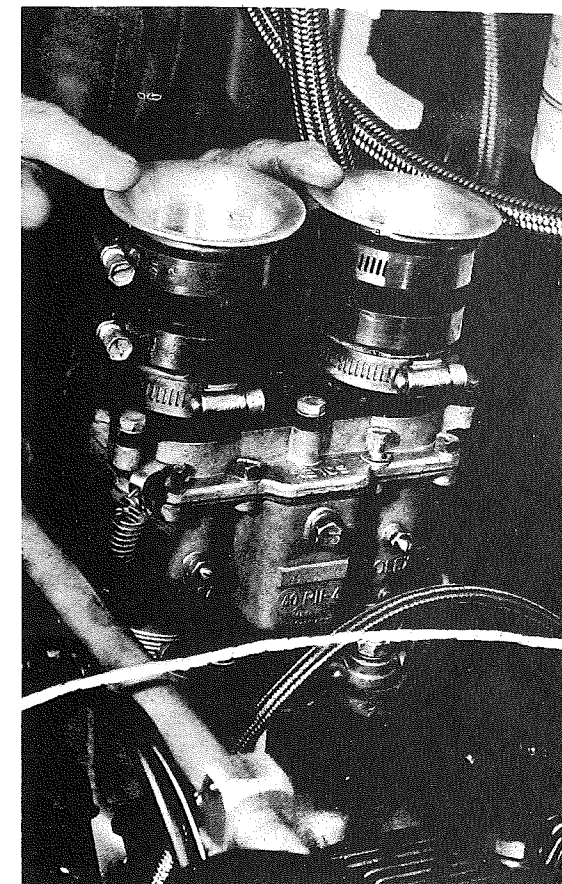
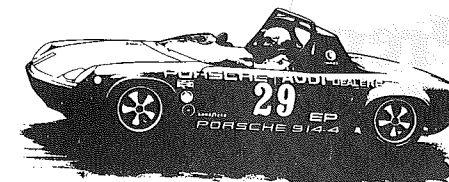
## Tires, Camber, Engine



## Part II

**T**he tires are the only contact between car and ground, and the biggest determining factor in terms of cornering and traction force. Here, Goodyear slicks with a 24 x 8-1/2 x 15 size have proven ideal on a dry track and should be mounted on 7 inch wheels—the widest the rules allow. Generally, Ginther prefers to find a tire pressure that works well and stays with it. Handling changes are then worked out with chassis and suspension rather than by tire pressure changes.

**G**oing to a wide modern racing tire makes it particularly important to keep the footprint evenly on the ground. When you start getting too much camber and tip the wheel you lose footprint. For instance, you might think in terms of negative camber—having the wheel tipped in at the top to counteract tire roll and to gain more cornering force, and yet when you do that, you'll lose the footprint and go into an understeer. Both Richie Ginther and Elliott Forbes-Robinson suggest getting a pyrometer. A good one can be bought at a racing tire store for around \$100.00, which, compared to the car, is a very minor investment. A pyrometer is used to measure the temperatures on each tire at the inside, center, and outside edge as soon as the car pulls into the pits. This tells you not only what the car is doing as a whole, but also how each individual tire is working. For instance

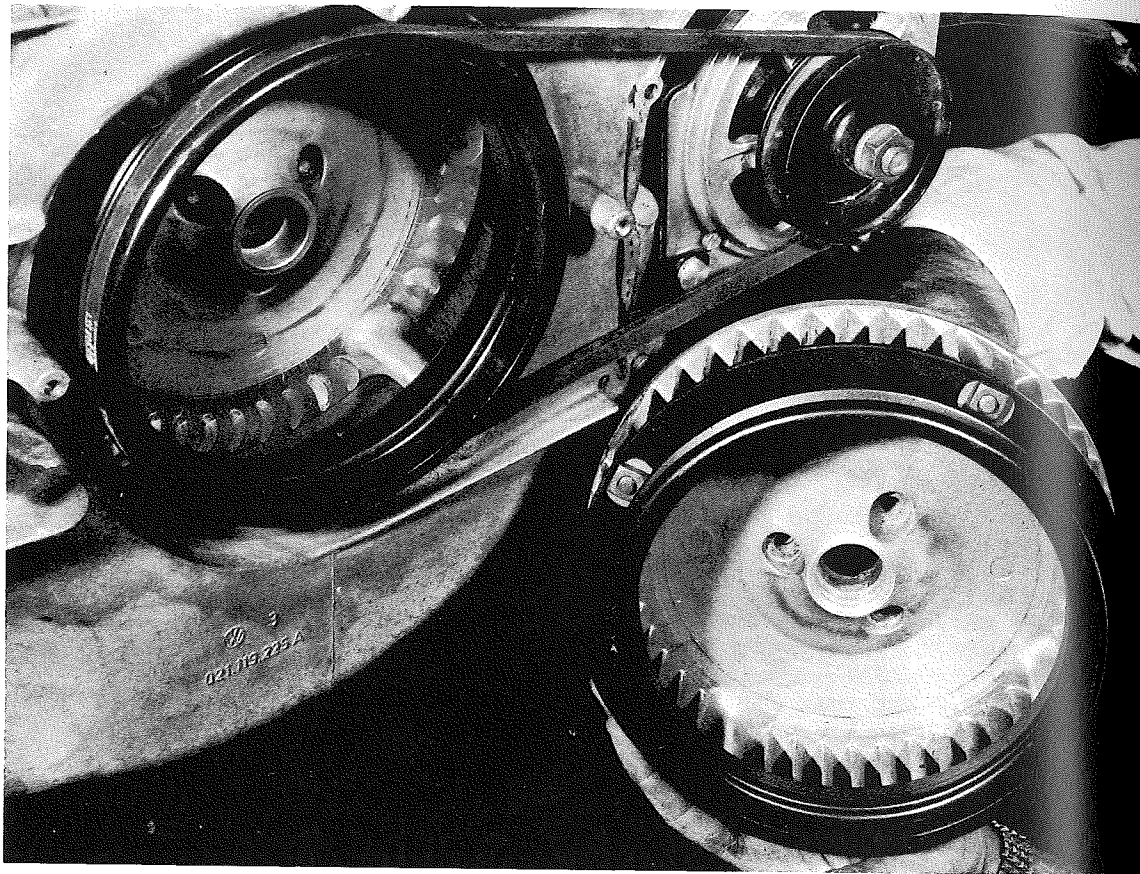
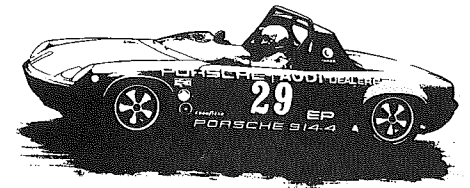


*The intake stacks are purposely made of unequal height. This helps smooth out the torque curve.*

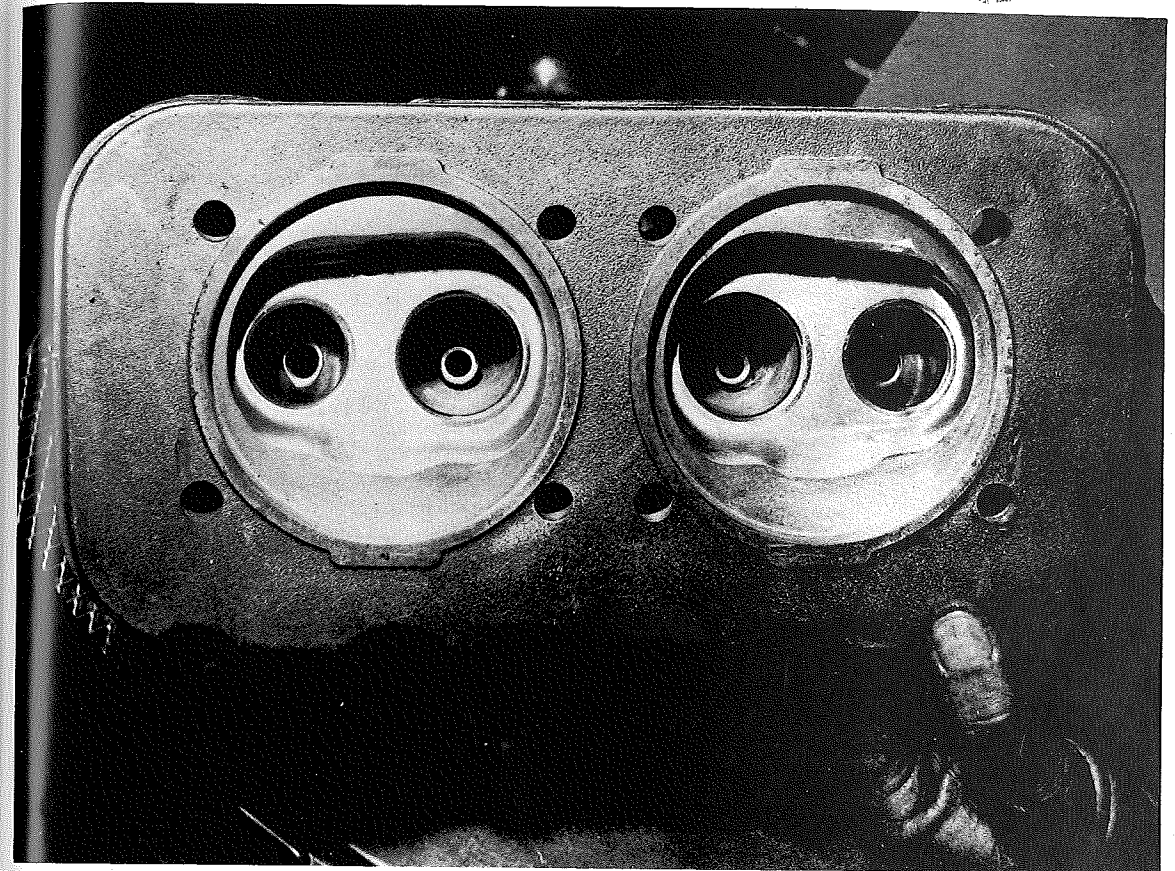
were put on both the front and the rear of the car. A softer suspension with less roll resistance turned out "not to be for the track." Stiffening the front only would make the car roll onto the front tire and unload the rear. Trying to warm up the front tires by throwing the front into the turn doesn't help. And neither did the original shock adjustments. Changing to the current springing gave excellent results. Normally, an adjustable rear stabilizer bar helps, but it didn't in this application. Now, the current springing readily allows you to

# Preparing the Porsche 914-4 Part II

continued



All of the fins except for the four main stands are cut off from the fan to reduce the horsepower loss.



Corners in the original combustion chamber are radiused to prevent detonation. Standard 411 valves are necked down for better flow.

Porsche Audi store near him, which insures knowing the individual angles at the wheels and also checks that the rear toe-in is split evenly between the wheels. Adjustments made at the track are always rechecked on the equipment at home base. A check of the toe-in changes (bump steer) induced by the front suspension travel led Richie Ginther to raise the steering rack .625 inch by placing aluminum spacers between it and the body mounts. (Those spacers are now available as a

**W**hen the car is lowered, the front wheels pick up some negative camber. The desired  $\frac{1}{4}$  to  $\frac{1}{2}$  degree negative front camber is restored by working with a slotted adjustment at the top pivot of the front suspension. Caster is kept at a minimum. Ginther adds that you don't rely on the steering return that caster induces and keep steering wheel control at all times including the straight by using the steering wheel.

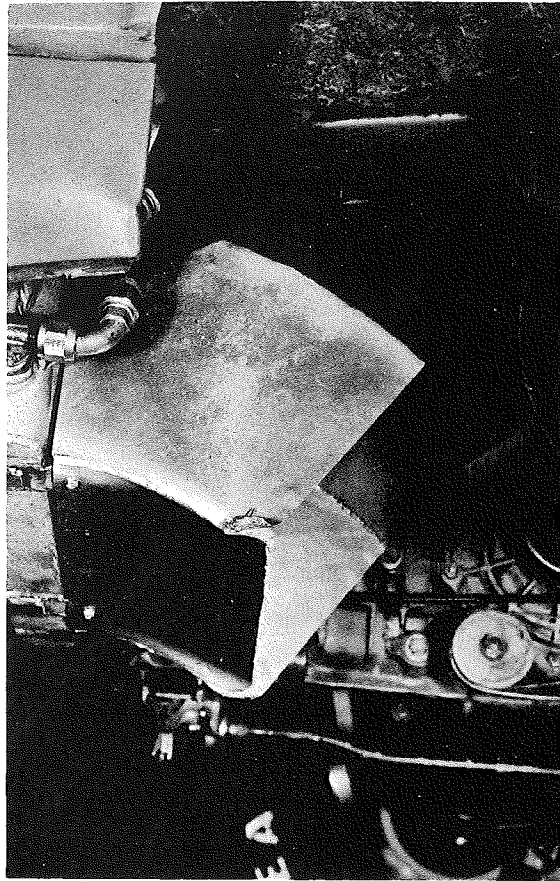
be aimed straight ahead, but for all practical purposes, 20 minutes of toe-in per wheel (60 minutes is a degree) helps cornering and makes the car get around faster.

**N**ow that your 914-4 is ready for the course, and you have done enough playing and practicing with it to evaluate what it will do in terms of

going in. If this rpm drops you out of the best engine power range, you'll probably think in terms of making some gear changes. You'll also have to know the mph and rpm at the end of the straight so as not to go over the red-line. Fortunately, there are many rear ratio sets available for each speed in the Porsche trans. Later, at the track, you may change ratios to suit a particular turn or to get the best compromise between two different turns. Porsche as a whole is a very good company and

# Preparing the Porsche 914-4 Part II

continued



*An oil cooler and a special air scoop were added at the right rear corner.*

will transform your 914-4 into a machine that can deliver 131 hp at 6,000 or 156 at peak rpm.

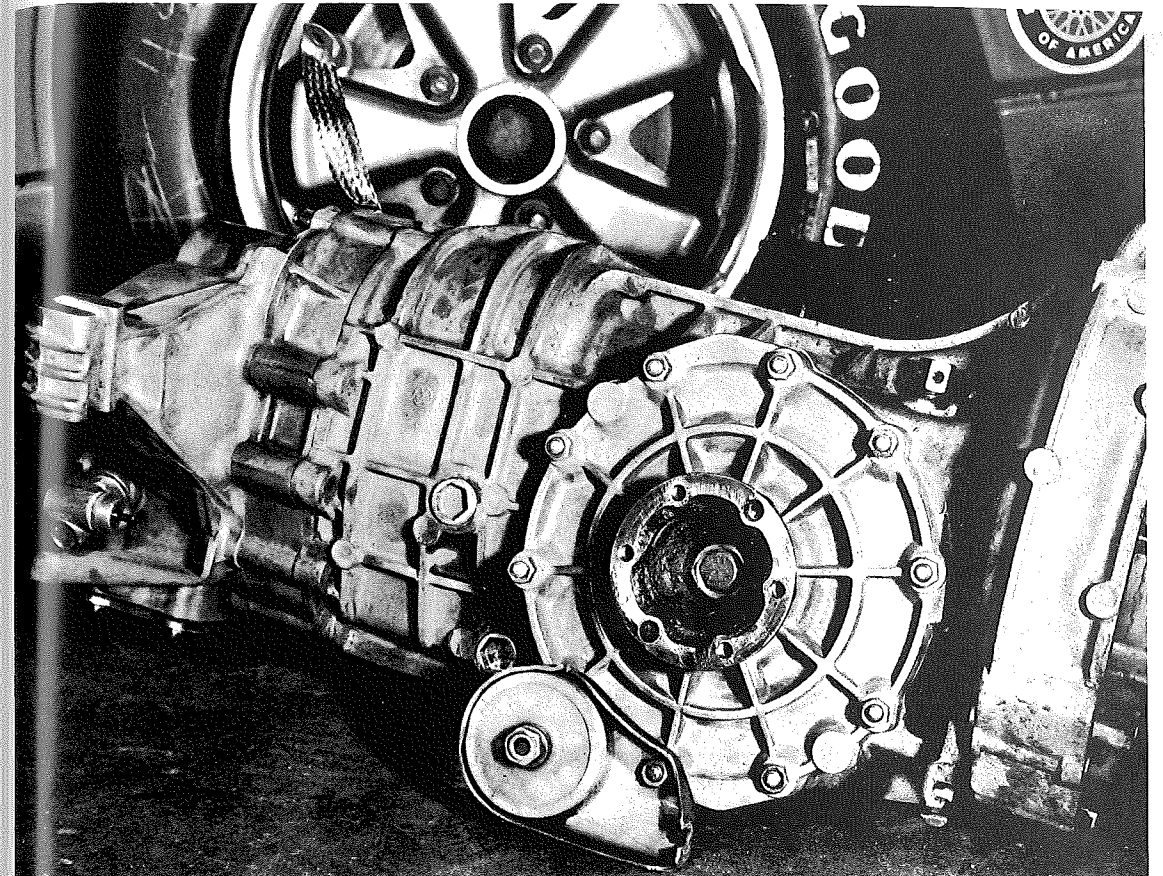
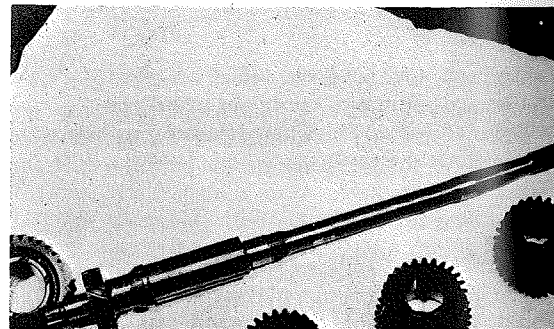
**G**inther increases the rod bearing clearances by .0008 inch in an effort to up the oil flow and the cooling for the rod bearings. The mains remain at standard size, so as not to lose too much oil pressure. All of the journals are micro polished as the final step after balancing (if you do it before balancing, some nicks and marks may be introduced by the bob weights.)

flywheel to between .07 and .12. The flywheel on the 914 is retained by five bolts rather than a gland nut and here the tightening torque is raised to 61 foot pounds.

Connecting rods are deburred at all edges and the bolts must be Magnafluxed. Special Mahle pistons are available with a wedge shaped pop-up and Harold Broughton fits them to a .004 piston to wall clearance by honing out the cylinder barrels. The job can either be done in a special jig, or in the crankcase if you are careful not to hit the hone against the main webs. With the 914 you are allowed to machine the cylinder liners .020 inches in an effort to gain more compression (machining the cylinders brings down heads with respect to the piston). However, both cylinders under a given head must be machined the same amount so as to maintain a good seal.

**Y**ou can use clay in checking for the piston to head clearance. However, clay has to be cut and miked, which makes it difficult to be accurate. Instead, Harold Broughton suggests pre-assembling the engine without the head gaskets, which takes .030 inch away from the clearance. A little white lead or machinist's glue will quickly show up areas that touch and allows you to recontour the piston accordingly. The gasket is made up of two folded sections adding up four layers and fits on the

*Individual gear ratio on the Porsche transmission can be changed to suit any particular course.*



*Watch the rpm going into a corner, then figure the correct gear ratio to raise or lower it.*

shoulder of the cylinder barrel. Richie Ginther considers a dyno as an absolute must in developing the engine detailing and has done extensive work with modified pistons as well as with changes in porting.

The actual seat contact has been pulled closer to the edge of the valve, to within .015 inch of its outside diameter. Sodium cooled valves are not used. Instead, Ginther prefers the standard 411 valves which are solid and can be necked down for improved flow. When the work is completed, these valves are lighter than the sodium filled ones.

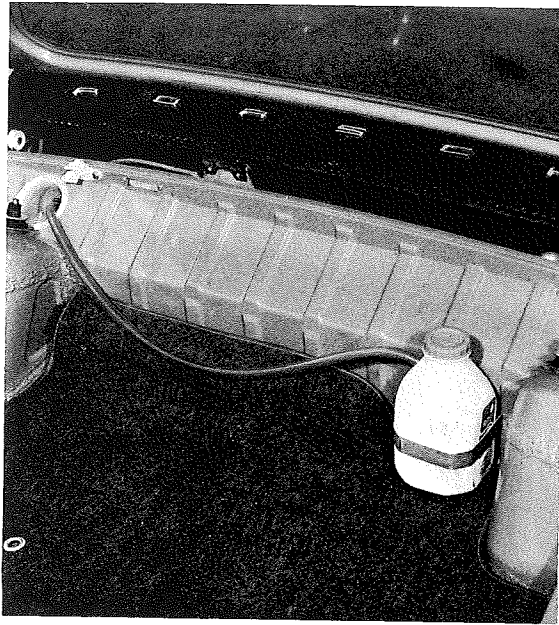
will go on snugly. He also makes up special valve spring retainers with two separate shoulders, one for piloting the inner spring and the other for the outer spring. They are fitted so closely that the retainer and the springs must be pressed together.

**O**ne important point is to give some added clearance at the rocker shaft by honing out the rockers. A .003 clearance gives more oil and prevents seizures. Also, the rocker studs should be Loc-tited to prevent them from coming out. To determine the correct push rod length, you can make up a tool in the form of a small push rod, cut in two and



# Preparing the Porsche 914-4 Part II

continued



A catch can be installed in the trunk; acts as a vent for the transmission and engine.

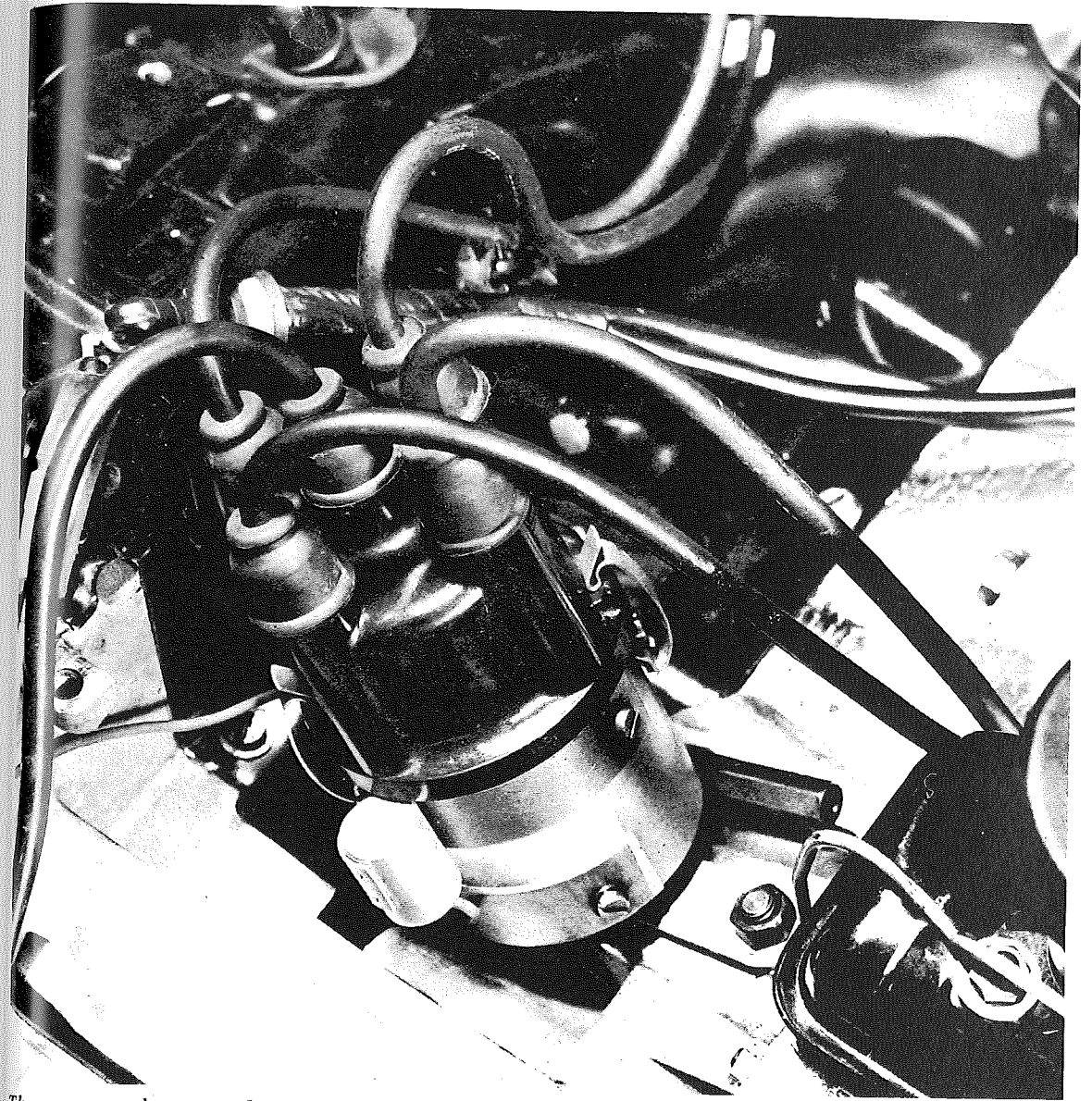
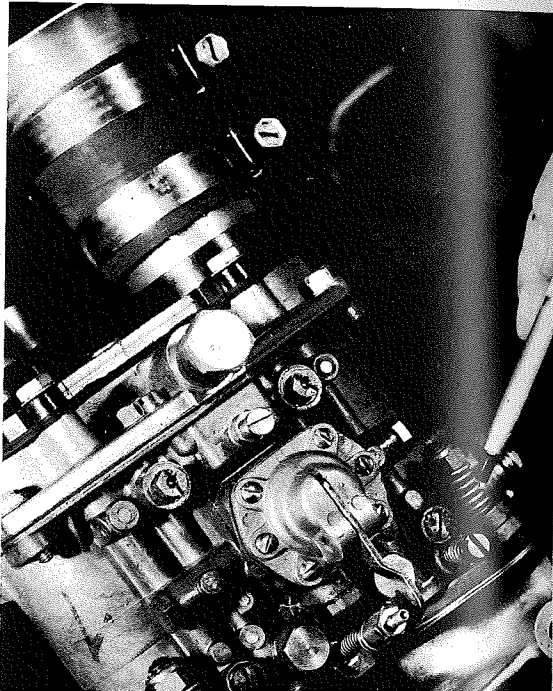
and you can move the cam and gear to get the correct timing.

The Porsche engine likes cylinder head temperatures of around 200°C., at the cylinder head. The pick-up is installed between the plug boss and the nearest center bolt hole. The drilling for the pick-up comes to within a quarter inch of the combustion chamber. This gives the driver a quick check on operating temperatures. To improve the cooling on the Porsche, the trough under the engine cover is removed. Since all fan blades are removed, leaving just four stands, there is little chance of over-cooling the engine. A separate oil cooler is installed under the right rear fender and fitted with a projecting air scoop.

Carburetor work begins with insuring a good fuel supply. For instance, the original distributor

The Solex 40P11-4's have been tried out with a range of different venturis and are jetted out on the dyno. Your best bet is to start out rich enough so that the engine won't get hurt from detonation and work down from there. As development work has proceeded, less and less accelerator pump shot has been used. The carburetors are never mounted solidly on the engine because vibrations at high rpm cause the fuel to froth and foam. This, in turn, upsets the metering. The cure is to use a half-inch thick neoprene sheet cut the size to act as a gasket between the carburetor and the manifold. This, in turn, damps out the vibrations and prevents the frothing. The carburetor retaining bolts or studs

To keep engine vibrations from frothing the fuel at high rpm the carburetors must be mounted flexibly, with thick neoprene gaskets at the interface, and with springs at the studs.



The vacuum advance on the original Porsche distributor is eliminated and so is the set of points that trigger the fuel injector system. A handmade plate covers the original access hole opening.

cannot be overtightened or the mount goes solid. Also, spring retainers are used at the carburetor

The Porsche has a vacuum spark advance that is removed and a cover is used at the opening. Also

