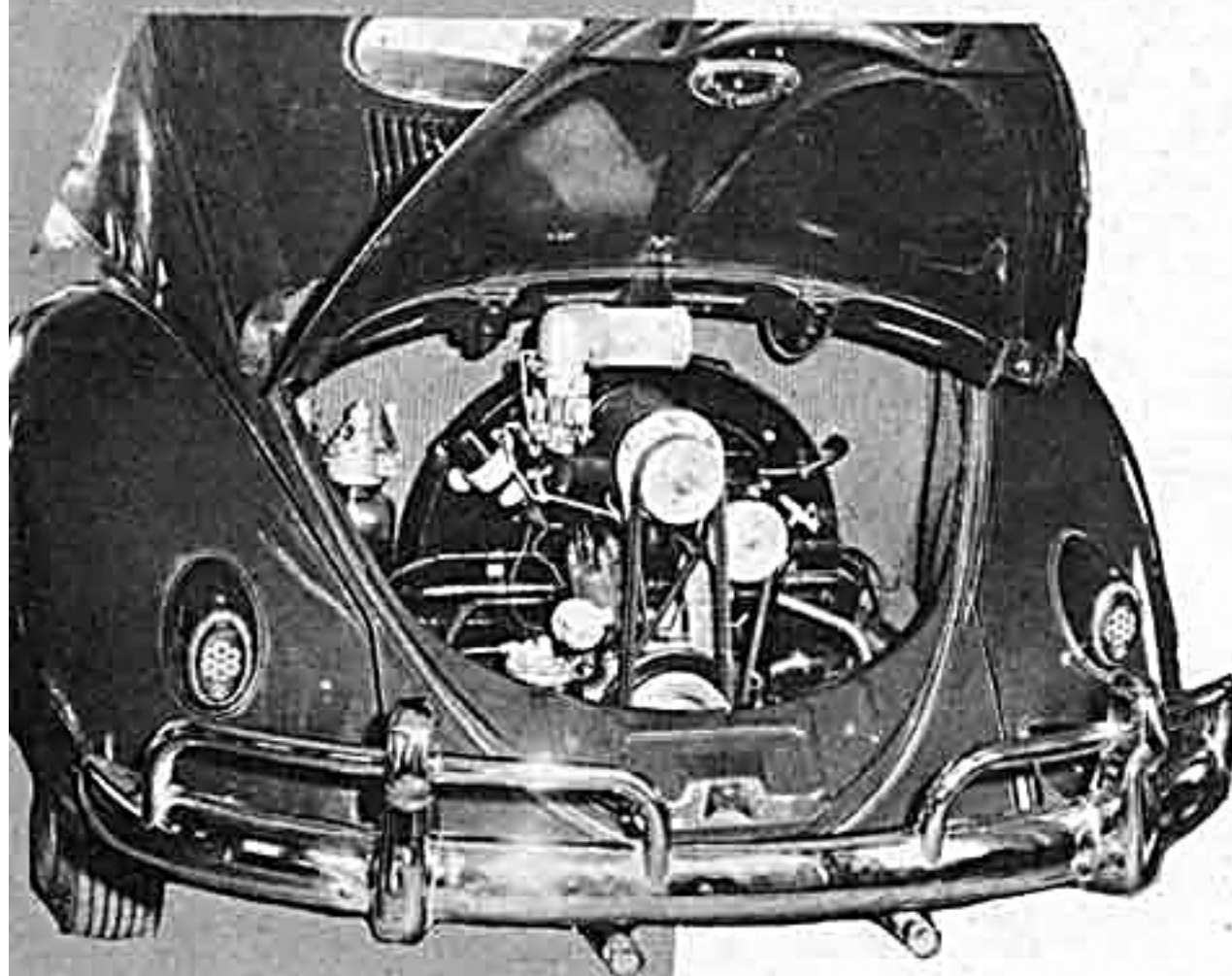


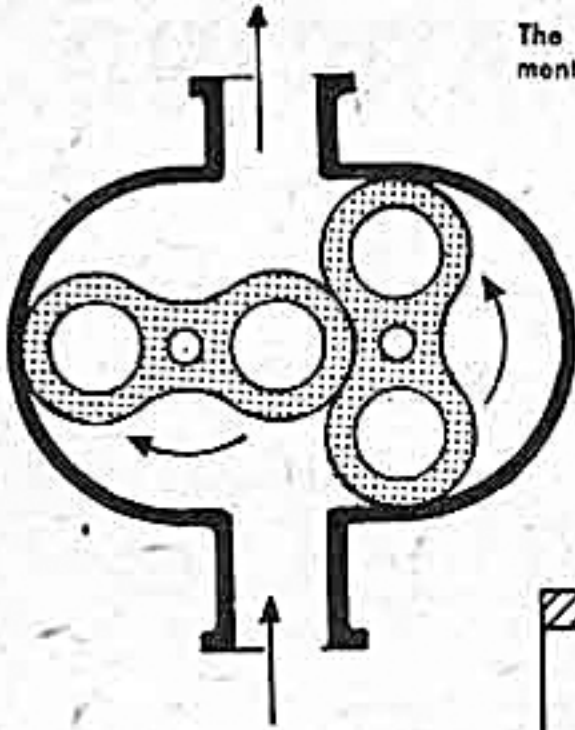
# SUPERCHARGING

**Mild Boost in Pressure Provides  
Better Performance in All Gears**

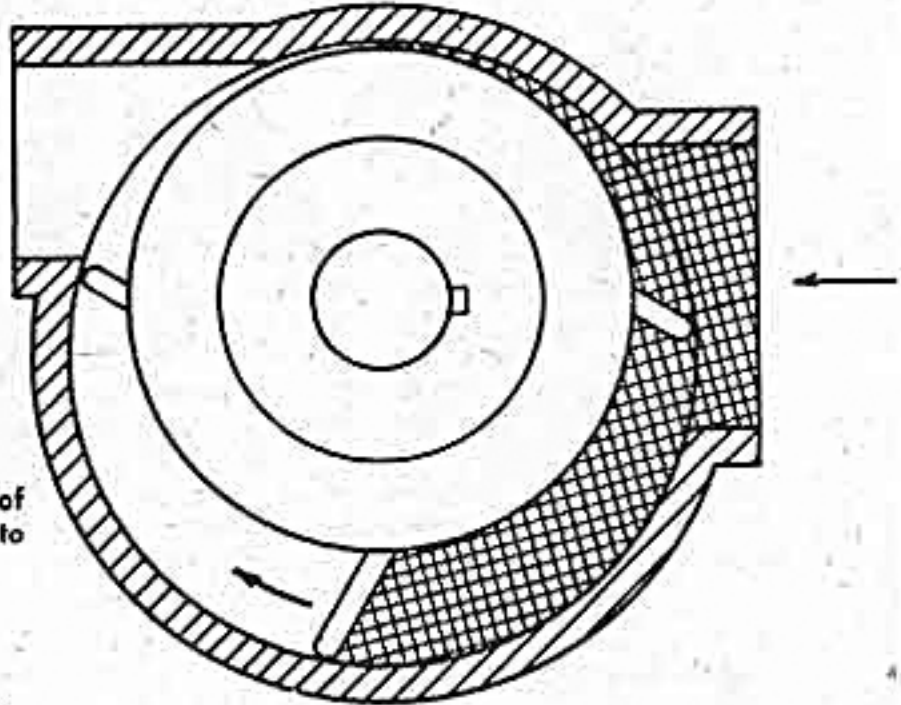
Below: This VW equipped with Judson supercharger is said to give 45 percent increased power and performance in all gear ranges.



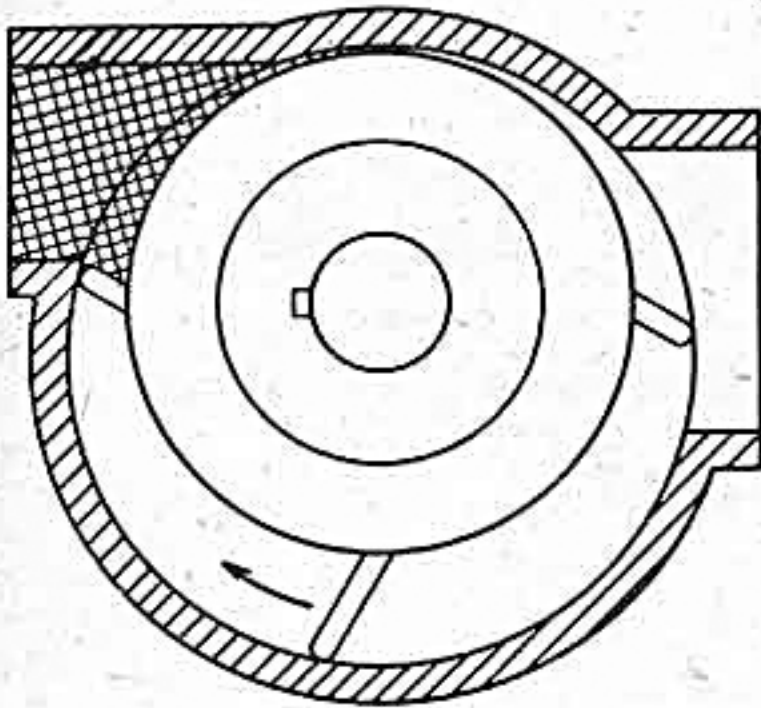
The Roots type compressor has rotating lobes. Those mentioned in this article are 3-lobe rather than 2-lobe.



In the Judson vane type blower the hub is eccentric to the case and vanes are mounted in the hub.



As hub rotates vanes follow outline of case scooping up air and forcing into the cylinders.



► One sure way to increase the performance of an automobile engine is to supercharge. This applies to the VW engine as well as any other. Volkswagen Werk, of course, opposes this practice as much as they oppose any other modifications to their vehicles that are not made by the factory itself. Nevertheless, some owners want better performance and this chapter is given merely to tell them what to do and where to get equipment.

Let's not pass over the VW factory opposition too lightly, The VW officials maintain that the car as design-

ed and built by their engineers, will give thousands of miles of trouble free operation. They feel that the reputation of the VW in this regard is most important to them and tampering with the design and construction may result in damage to the VW's staying power, both from the standpoint of stamina and economy.

Manufacturers of superchargers, on the other hand, hold that the VW engine is sturdy enough to stand up under supercharging with no bad results.

All automobile engines depend upon atmospheric pressure to feed air into the cylinders. In the conventional engine the fuel and air are mixed in the carburetor before entering the engine. In the fuel injection type engine the air is forced into the cylinder by atmospheric pressure and the fuel is injected through a nozzle under pressure supplied by a mechanical pump.

Hence it follows that the problem of getting more power lies in getting a greater power charge into each cylinder before it is fired by the spark plug. Atmospheric pressure at sea level is roughly 14 pounds per square inch. Pressures decrease at higher altitudes. When an engine is operating at speed, the intake valves, around and through which the air must find its way into the cylinder, are open for only a fraction of a second. In that time it is impossible to completely fill the cylinder with fuel air-mixture with only normal atmospheric pressure forcing in the charge. The supercharger adds a boost to that pressure thus increasing the volume of fuel and air entering the cylinder on each intake stroke.

This increase in air-fuel volume works in two ways. The compression ratio of an engine represents the swept volume or capacity of the



cylinders plus the volume of the combustion chambers divided by the volume of the combustion chambers. Thus, in an engine which is said to have an 8.25 to 1 compression ratio, the capacity of the cylinders with the piston at bottom dead center is 8.25 times as large as the space above the top of the piston when the piston is at top dead center. Therefore compression ratio is somewhat theoretical and actual compression depends upon how nearly completely the fuel-air charge fills the cylinder at the time the compression stroke is started. Only when the cylinder is completely filled can it be said that an engine is operating at its rated compression ratio. This condition seldom occurs in actual operation. For instance, a Chevrolet V-8 engine with a rated compression ratio of 8.25 to 1, actually operates most of the time at about 4 to 1 compression when the car is running at say 45 mph.

Obviously, if the supercharger can force more air-fuel mixture into the cylinders it automatically increases the effective compression ratio over the ordinary aspiration induction. Just as when we compress a spring tightly, its reaction will be greater, the more we compress the fuel charge the greater the force of its expansion becomes when the charge is fired. Thus more thrust is imparted to the crankshaft on the power stroke.

There are three types of superchargers or blowers—the vane type, the Roots type and the centrifugal type. Since the equipment available for the VW engines falls into the first two categories only—the vane type, Judson, and the MAG, Corey and Pepco models which are Roots type, this discussion will be confined to those four brands.

The Judson vane type has three vanes that are set in a hub which is mounted eccentrically inside the supercharger case. As the hub rotates

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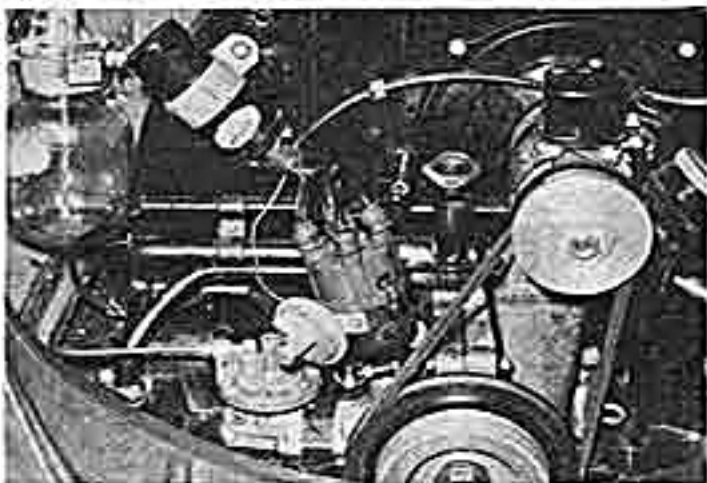
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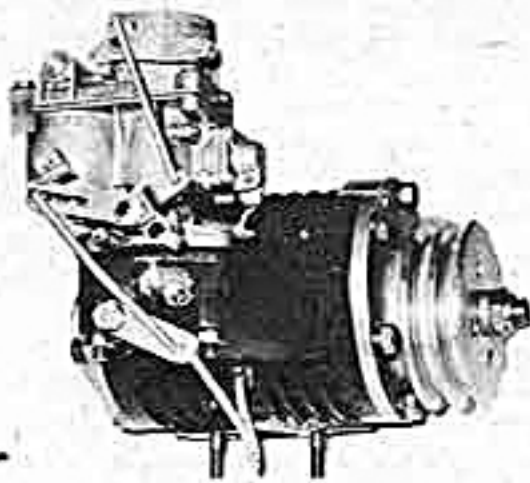
To install Judson supercharger mount pulley on crankshaft. Replace flanged pulley.



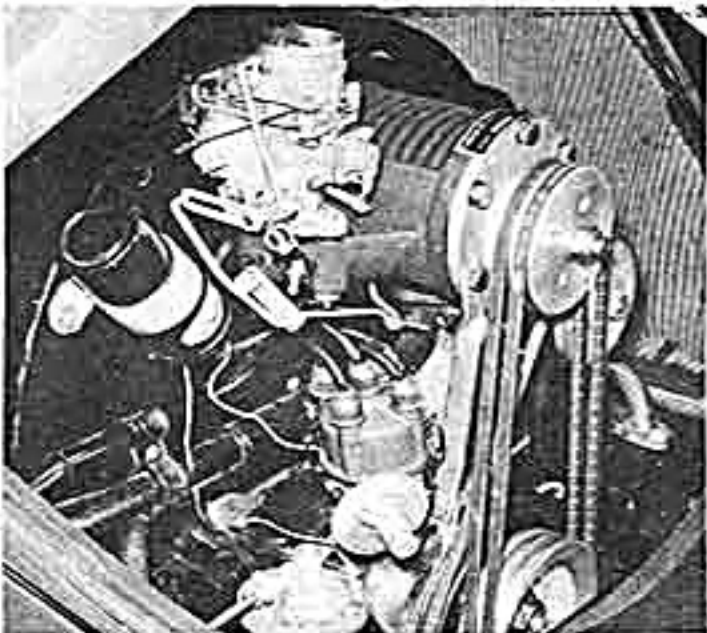
Remove air cleaner, fuel and vacuum line and carburetor from the engine.



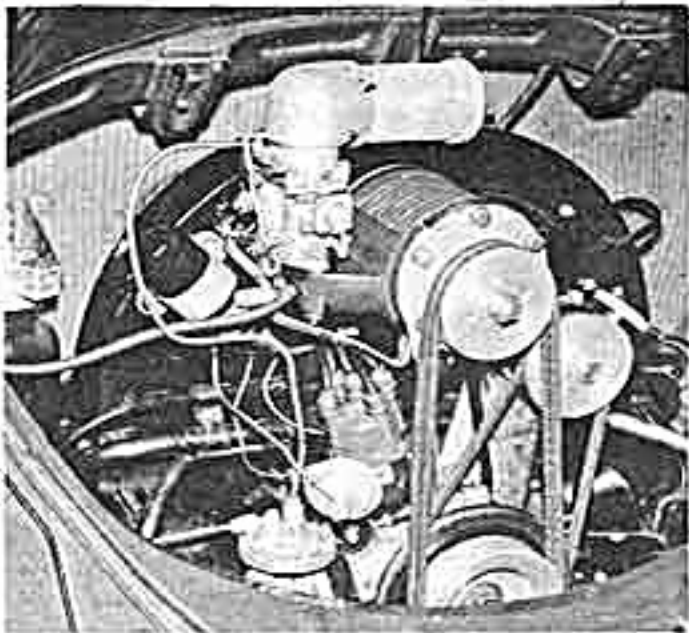
Mount lubricator on firewall with screws furnished with kit. Drill hole for choke control.



Replace studs and correction jet in carburetor and bolt to supercharger. Connect throttle.



Bolt supercharger to the engine, install drive belt, connect throttle and choke control.



Install original fuel lines, connect oil line to supercharger, mount air cleaner.



these vanes follow the walls of the case, moving in and out of the hub. In this way they scoop up air-fuel mixture entering through the carburetor, compress it and force it into the cylinders. The Judson type provides supercharging at all engine speeds. It is made by the Judson Research and Mfg. Co., Conshohocken 3, Penna.

The Corey, MAG and Pepco are all Roots type with the air compressed by revolving rotors within the case. Each rotor has three lobes which are geared to rotate in opposite directions. The lobes mesh in rotation and act as impellers to force the air-fuel mixture into the cylinders.

Installation of the Judson, Corey and Pepco models is quite simple and requires less than two hours and no special tools to complete. All necessary adapters, linkage, fuel lines, etc., are provided with the kits. Basically, the carburetor is removed from its mounting flange on the manifold and remounted on the supercharger itself. The supercharger is then mounted on the manifold and linkage and fuel lines hooked up. Special pulleys are provided which are attached to the end of the crankshaft to accommodate the double belt drive to the supercharger. The amount of boost provided, of course, depends upon the ratio of the driven pulley on the supercharger to the driving pulley on the crankshaft. Most kits are set up to provide between 5 and 8 pounds boost which is ample. All have their own lubrication provisions separate from the engine. Some require special air filters, but the stock oil bath filter can be used with flexible tubing.

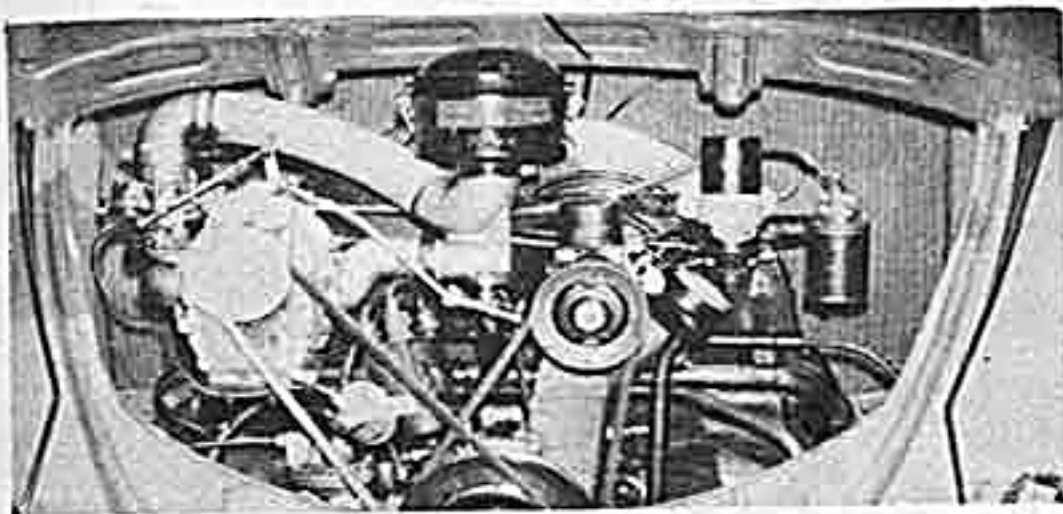
The MAG supercharger installation is different from the others in that it is mounted on a bracket welded to the induction pipe on the left of the engine. The compressed air is then conducted to the carburetor by a flexible hose. The MAG supercharger is dis-

tributed by Sports Cars of Carmel, P.O. Box 3746, Carmel, Calif. The Corey is produced by Bill Corey, 17 E. Holly Street, Pasadena, Calif., and the Pepco is made by Progressive Engineering Products, 647 West South Street, Akron, Ohio.

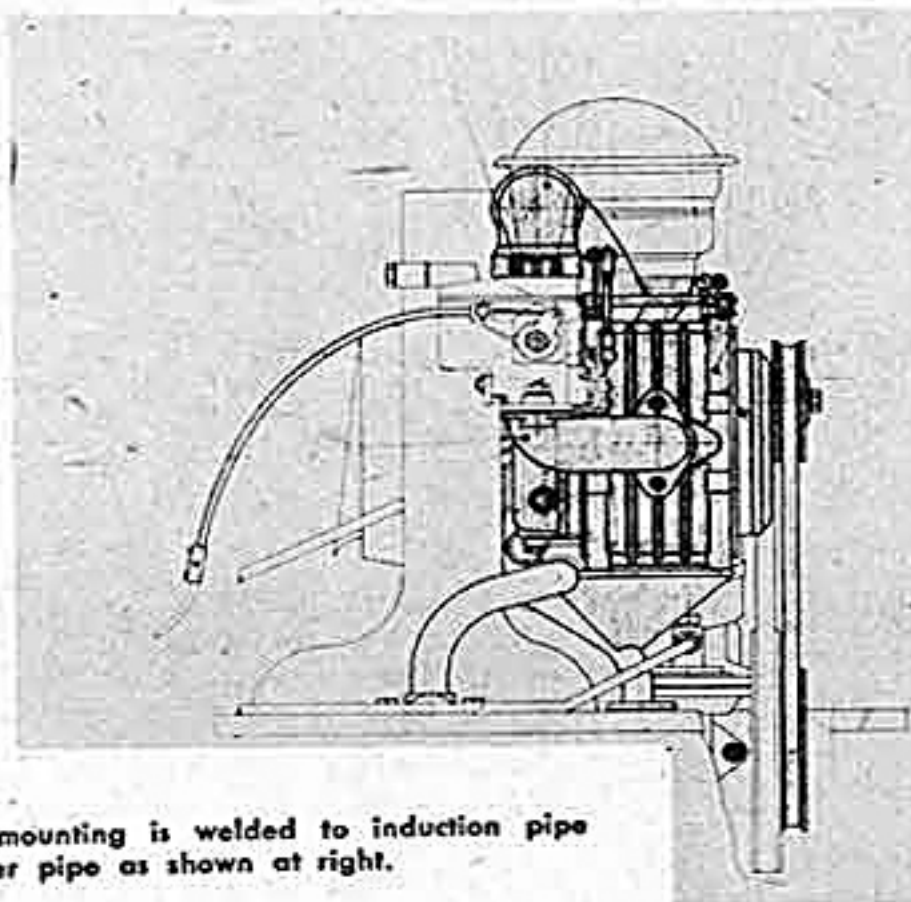
Judson reports the following improvement in VW performance with its vane type supercharger: For acceleration, 0 to 30 mph stock, 7.5 seconds, supercharged 4.2 seconds; 0 to 40 mph stock 13.5, supercharged 7:0; 0 to 50 mph stock 20.0, supercharged 10.2; 0 to 60 mph 30.5 supercharged 15.5. Maximum top speed stock 70 mph, supercharged 85 mph. Maximum horsepower at rear wheel stock 24, supercharged 42. Rear wheel horsepower at 2000 rpm stock 14, supercharged 23. Maximum brake horsepower stock 36, supercharged 57. Weight to power ratio stock 44, supercharged 26. Fuel consumption in miles per gallon stock 31, supercharged 29. The Judson supercharger weighs 17 lbs.

Corey test results are reported differently but add to much the same thing. Corey acceleration figures place the 0 to 30 stock at 7.9 second, supercharged 4.5; 0 to 40 stock 13.9 seconds, supercharged 7.1; 0 to 50 stock 19.8 supercharged 14.5; 0 to 60 stock 30.2 supercharged 15.9. Elapsed time from a standing start for one-quarter mile stock 23.9 seconds, supercharged 19.4. Pounds pull on Tapley meter in high gear stock 117 lbs at 37 mph; supercharged 165 lbs. at 42 mph. Maximum top speed stock 71.2 mph, supercharged 84.9 mph. Maximum speed on 10 percent grade in third gear stock 37 mph, supercharged 48 mph. Rear wheel horsepower at 2000 rpm stock 13.5, supercharged 19.5. Corey, MAG and Pepco superchargers weigh about 18 lbs.

Prices of the superchargers run from \$144 for the Judson, to \$265 for the MAG.



The MAG super charger is mounted to the left of the VW engine and not directly on manifold.



Bracket for mounting is welded to induction pipe and heat riser pipe as shown at right.