

SPORT BUGGIES

MARCH 1969

60¢

**NEW
BUGGIES
FOR 1969**



**HOW
FLOTATION
TIRES
WORK**

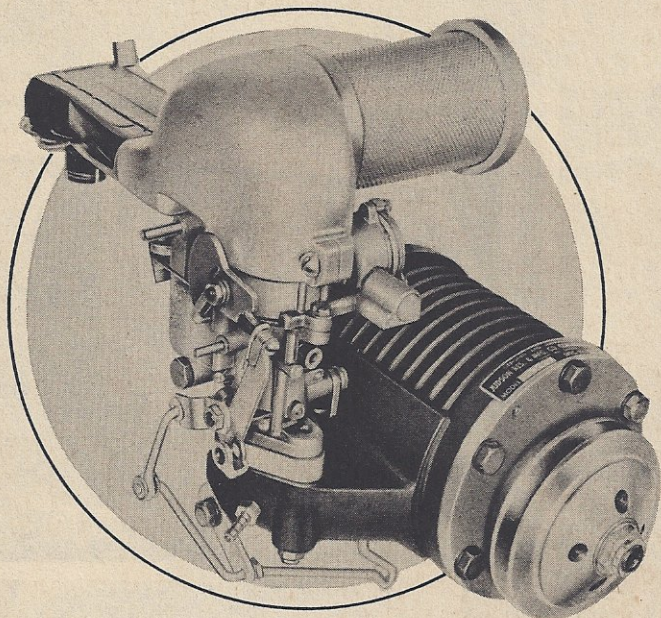


**SUPERCHARGE
YOUR
BUGGY**



**OFF
ROAD
RACES**

THOSE WONDERFUL JUDSON SUPERCHARGERS



After a buggy is built and the owner takes it out for the first few tries on the dunes or trail he is pleasantly surprised with the results. With about half or more of the weight of the VW sedan gone, the sparkling performance of his sport buggy comes as an extra bonus. But, as he becomes accustomed to his machine, every buggy owner starts wanting more. There are dunes to be climbed that it just won't make, trails that take more power than he has, or maybe it is just on the street where someone else has a little more zip.

Articles in SPORT BUGGIES have shown many ways to get this extra power but many of these methods have

required more skill than the average backyard mechanic can muster. Well, if more power is what you want, and expensive modification bills are what you want to avoid, take a look at what Charles Judson has done for the Volkswagen engine with his wonderful supercharger.

Most sport buggy enthusiasts will immediately conjure up a picture of an exotic accessory that requires an engineering degree to run let alone install. Not so! There are 90,000 VW Judson's in operation today and most of them were installed by enthusiasts who had no formal training in mechanics.

Why a supercharger? There are a lot of reasons. Without getting too technical, there are a few that will surprise most enthusiasts who have not thought much about the specifics of the supercharger.

First, they really aren't expensive for the VW engine, about \$150.00 plus shipping and tax. Then consider that the Judson adds about 17 pounds to your buggy's weight while almost doubling the horsepower. Power on the 36 hp VW shoots up to 57 while the 40 hp models increase to 59 hp. More than

figures, the performance increase is truly revealing of what supercharging can do. A sedan takes an average 28 seconds to get to 60 mph in stock form, supercharged it will do it in 13 seconds.

Strangely, while most persons have heard of the supercharger, few know what they are or what they do. There are many technical terms to describe the accessory but simply put, they supply fuel to the engine in increased quantity thereby providing more force on the piston.

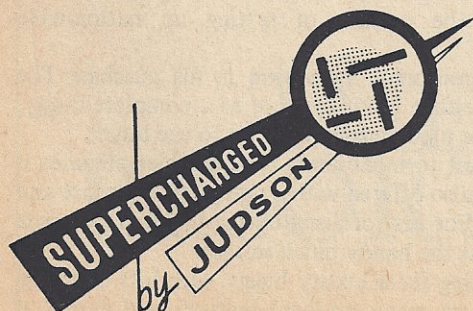
When it is remembered that the power output of any internal combustion engine is limited by its ability to take in air or breathe the function of the supercharger is easy to understand. In order to produce power, fuel must be combined with the correct weight of air to produce the energy necessary to push the piston. The unsupercharged engine depends on getting the fuel/air mixture to the cylinder through the suction created by the piston. Seldom are all the cylinders completely filled with fuel.

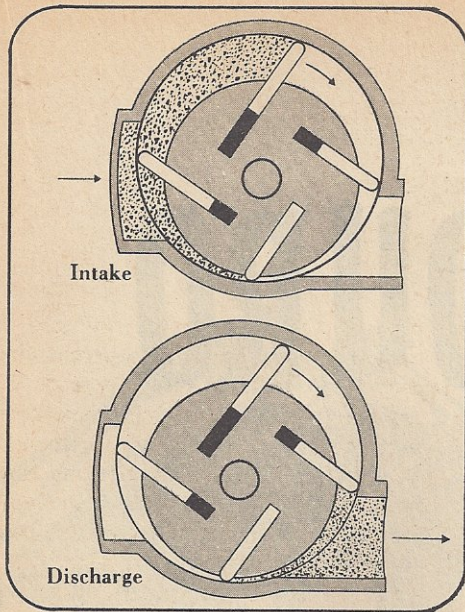
Supercharged engines do not depend on suction to charge the cylinders, instead they have their fuel pushed in under pressure. A supercharger is simply a blower or compressor which places a greater quantity of the explosive mixture behind each power stroke of the piston.

By doing this, supercharging increases the horsepower developed by increasing the torque. Additional horsepower is not obtained by increasing the speed or rpm of the engine. The engine simply develops more horsepower at the same speed.

Basically there are three types of superchargers. Each type is different in construction, performance and general characteristics.

The centrifugal type of supercharger must operate at extremely high speeds in order to be effective or efficient (25,000 to 30,000). This type of supercharger functions on the principle of velocity or a fan. It has no internal compression but the mixture or charge is compressed in the manifold from the back flow of the previously delivered





performance data FOR VOLKSWAGEN SEDAN

| | 36 HP engine 1955 — 1960 | | 40 HP engine 1961 — | |
|----------------------------------|-----------------------------|--------------|------------------------|--------------|
| | Unsupercharged | Supercharged | Unsupercharged | Supercharged |
| Acceleration in seconds: | | | | |
| 0—30 mph | 7.5 | 4.2 | 6.5 | 4. |
| 0—40 mph | 13.5 | 7.0 | 11.0 | 6. |
| 0—50 mph | 20.0 | 10.2 | 17. | 9.5 |
| 0—60 mph | 30.5 | 15.5 | 28. | 13. |
| Maximum speed | 70 | 85 | 71 | 85 |
| Maximum HP at rear wheels | 24 | 42 | 31 | 49 |
| Rear wheel HP @2000 RPM | 14 | 23 | 19 | 30 |
| Maximum engine brake HP | 36 | 57 | 40 | 59 |
| Weight to power ratio | 44 | 28 | 41 | 26 |
| Fuel consumption, mpg | 31 | 29 | 31 | 29 |
| Noise level (Decibels) | 55 | 55 | 55 | 55 |

All performance figures are averages of several runs.

charge. Because of this characteristic the temperature of the fuel reaching the cylinder is raised considerably, requiring a larger quantity of fuel to aid in cooling. A centrifugal supercharger is not ideally suited to an automotive engine which must operate over a wide speed range where the increase in power is needed at slower engine speeds.

The lobe type of supercharger consists of a pair of rotors which mesh with each other similar to a gear. Like the centrifugal, the lobe type also increases the temperature of the charge reaching the cylinder resulting in ignition problems and additional fuel being required for cooling. The lobe type is best suited for a stationary engine application which operates within a narrow speed

range and is not subject to constant acceleration and deceleration.

The Judson Supercharger is a positive displacement rotary vane type and actually compresses the fuel/air mixture. The mixture is introduced into the supercharger at the intake port, actually compressed within the supercharger, and blown out the exhaust port into the manifold. The temperature of the charge or mixture reaching the cylinder is not increased on the vane type supercharger due to a change in volume as the mixture leaves the supercharger and enters the intake manifold of the engine. Judson's superchargers operate at engine speed and perform throughout the entire speed range of the engine. The output of the rotary vane type

supercharger is not dependent upon speed; nor are there any cams or gears to wear causing a loss of efficiency. Additional advantages of the Judson type are that it requires 15 to 25 percent less horsepower to operate and is almost absolutely silent in operation. Also, because of the lower operating temperature of the vane supercharger, no basic modifications are required in the fuel pump or ignition system.

Judson's supercharger is actually an automatic device that replaces the vacuum in the manifold instantly and automatically in proportion to the load placed on the engine. The engine is supercharged only when you need additional power. This is determined by the load placed on the engine and the position of the throttle. The additional horsepower afforded by the supercharger is not required at idle, in city traffic or in normal highway cruising. When the throttle is suddenly opened by depressing the accelerator, however, the engine immediately becomes supercharged.

Although the engine is not continuously supercharged, the supercharger itself is always in operation providing improved volumetric efficiency even at idle — allowing for a much smoother and more efficient running engine. This automatic feature of the Judson provides the driver with 45 to 50 percent more horsepower on an optional basis and it is instantly available.

The price to pay for the added power is slight and the average fuel consumption of the Volkswagen engine is increased only by about five percent. This is only a natural result of getting the increased power by improving the engine's efficiency.

