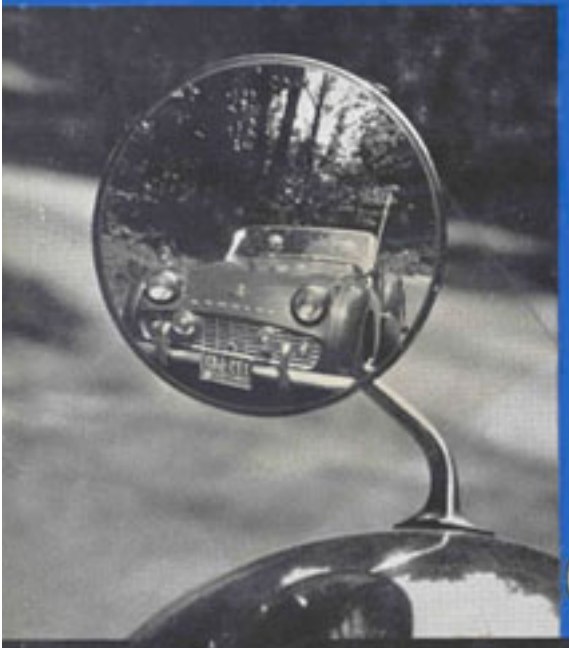
ACCESSORIES for your SPORTS CAR

by LARRY REID



$2.75

MODERN SPORTS CAR SERIES

You can enhance performance by improving the power-to-weight ratio of your car. The process is quite simple. You merely strip off everything that isn't actually needed to make the car run—this includes the body and the passengers' seats—and then drill the frame Swiss-cheese fashion. Your car won't look pretty, and you'll ride alone, but you'll go like the very devil.

It's doubtful whether you would care to go to such an extreme. We mention it merely to emphasize that you can go only so far without losing some of the qualities that go to make a well-rounded, usable car.

One of the easiest, most effective, and least expensive ways of gaining power is supercharging. The advantages of the blower are many.

You know in advance, and fairly accurately, what the increase in horsepower and torque will be. There's no guesswork.

You don't have to be an automotive engineer, or even an expert mechanic, to make the installation. Designing and engineering are all done for you. The supercharger is tailored for your engine, and it is almost literally a bolt-on accessory. More important, it does not require other modifications to the engine; you need not plane the head, "stroke" the engine, substitute special pistons, or alter the valve train. So if for any reason you ever want to restore the engine to its original state, about all that you have to do is remove the supercharger and put back the original carburetor and intake manifold.

Power costs money—this is an old truism—but dollar for dollar you'll achieve more added performance through supercharging than through any other means. Moreover, provided you don't raise the engine compression beyond sensible limits, a blower will not reduce the reliability or the life expectancy of your power plant.

The output of a gasoline engine depends on the amount of fuel-air mixture that is compressed within the cylinder when the explosion takes place. In an unsupercharged engine, the mixture is commonly said to be "sucked" into the cylinder. This is roughly true. However, it would be more scientifically accurate to say that the charge is forced into the cylinder by the pressure of the outside air acting to fill the partial vacuum which is created when the piston moves down on the intake stroke.

If the engine could take in an amount of mixture exactly equal to the piston displacement, its volumetric efficiency would be 100 per cent. But because the intake passages offer resistance to the flow of the charge, and because the force acting to induce the mixture is only atmospheric pressure (less than 15 pounds per square inch at sea level, and less than that at altitudes), the cylinder is never completely filled. The actual volume of admitted fuel charge divided by the piston displacement equals the volumetric efficiency of a given engine. It is an index of engine breathing efficiency. By providing a few extra pounds per square inch of pressure to the fuel-air mixture, a supercharger packs a denser charge into the cylinder, and thus raises the power output.

There are several basic types of superchargers, and they differ markedly. The centrifugal supercharger operates on the principle of an electric fan, and to accomplish anything in an automobile engine it must run at about 30,000 revolutions per minute. Parts rotating at this speed are apt to make unpleasant noises, and the load on the blower bearings is very high. The Roots-type blower uses twin lobes, much in the manner of an oil pump. The minute clearance which must be maintained between the lobes is extremely critical, and so maintenance on this type is likely to be a problem. Furthermore, a lobe supercharger has no internal compression; it compresses the charge within the intake manifold, with the result that unless an intercooler is incorporated, the high temperature of the fuel charge may burn valves and pistons, and unduly stress the crankshaft. This type also requires additional fuel for cooling as well as more horsepower to operate.

For sports car engines, the rotary-vane, positive-displacement supercharger appears best suited. It actually compresses the mixture, and since the change in volume takes place as the mixture enters the manifold, the temperature of the charge reaching the cylinder is not raised. In addition, a positive-displacement blower performs throughout the range of the engine; output is not dependent on speed. Finally, it is less subject to wear than other types, and it is easier to service.

The Judson Research and Manufacturing Company, of Conshohocken, Pennsylvania, makes rotary-vane superchargers for a number of imported cars, including the Volkswagen and the MG A.

Judson supercharger in an MG A. Positive-displacement blower is considered best way to improve performance of production car engines. Low manifold boost does not lower engine reliability in normal driving.

Judson's tests show that this blower, delivering moderate boost (about six pounds), will increase the rear-wheel horsepower of a VW up to 50 per cent. Judson stresses that this improvement derives from greater torque, not from higher engine revolutions. As a matter of fact, the VW engine lends itself nicely to supercharging: It is rugged, and it has a low compression ration and good valving.

A Judson-equipped VW, says the manufacturer, will accelerate from 0 to 60 mph in barely more than half the normal time—15.5 seconds *vs.* 30.5 seconds. Top speed is raised to 85 mph from 70 mph.

The mechanism is belt-driven; it uses no cams or gears. It contains its own oil reservoir. Virtually the only maintenance required is the replenishing of the oil supply every few hundred miles.

Naturally, you don't get something for nothing. In the case of a supercharger, you pay in fuel for the added performance. However, an increase in gasoline consumption of five to ten per cent is not too great a price to pay for so much more liveliness.

Installation of the Judson is simple, and the only alteration to the carburetor is the substitution of a different jet. The supercharger for the VW is priced under $150; estimated installation cost is $15. The kit furnishes everything you need, including a special air cleaner. The unit body measures 5½"x9" and weighs 17 pounds. It fits the VW, the Karmann-Ghia and the Transporter models.

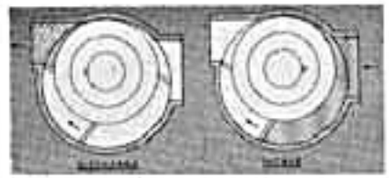
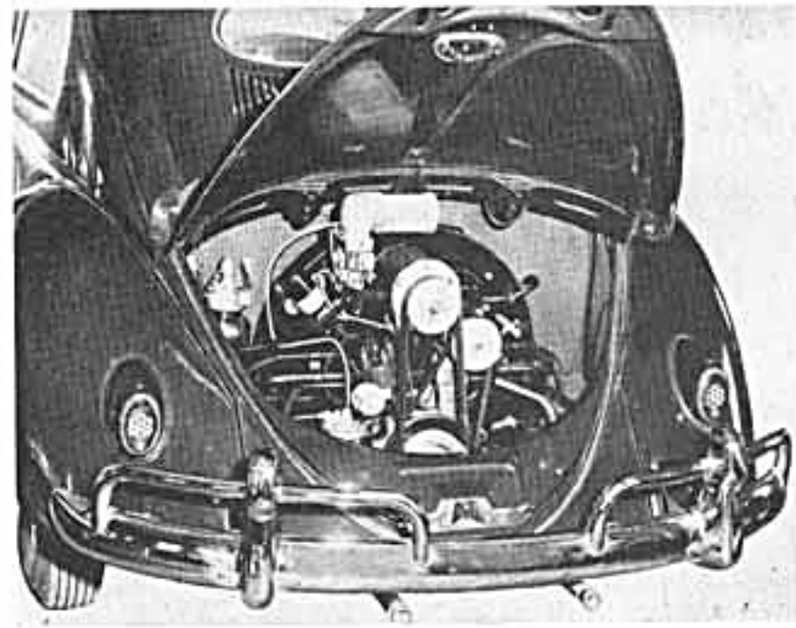


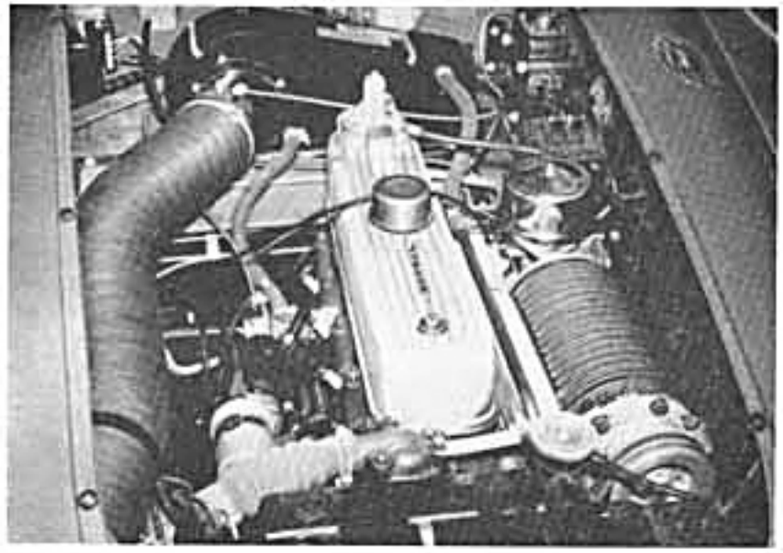
Diagram shows how Judson eccentric vane scoops fuel mixture from carburetor, compresses it before delivery to intake manifold.

The blower kit for the MG A includes a special carburetor, an air cleaner, and an aluminum valve cover which incorporates the automatic lubrication system for the supercharger. Judson guarantees a jump of 50 per cent in horsepower at the rear wheels, as well as increased torque, improved acceleration, and higher cruising speed.

One word of warning is in order: Though low-pressure supercharging will not in itself work undue hardship on a sports car engine of reasonable ruggedness, the added potential must be utilized

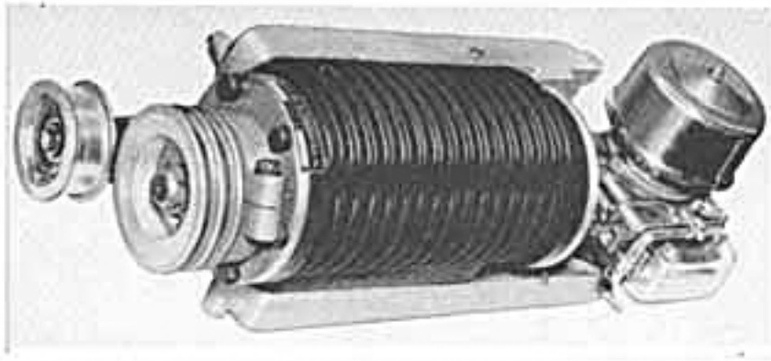


Rugged, low-compression VW engine is a natural for supercharging. Extreme accessibility facilitates installation.



Judson kit for MG A includes attractive valve cover which incorporates blower lubrication system.

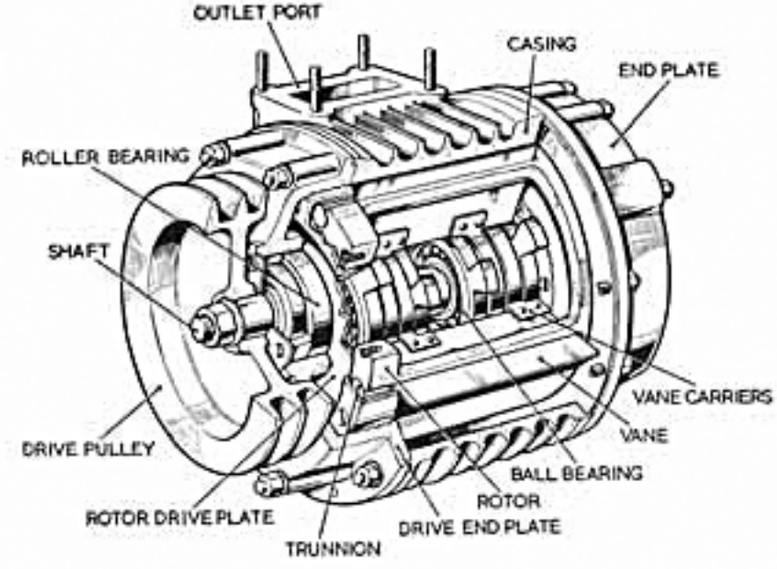
cautiously. It is easy to over-rev any engine, especially in the intermediate gears; blown, an engine will go over the red line even more readily. Your engine's rotating and reciprocating parts were designed



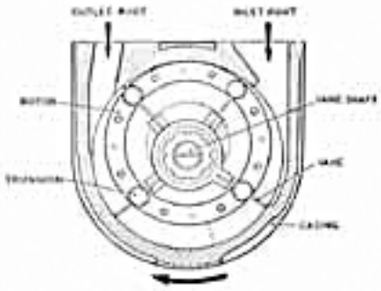
Essentials of Judson supercharger: special carburetor with air cleaner; compression chamber; belt drive pulleys.

For VW, Judson supercharger uses stock carburetor with an unusual air cleaner.

to operate within specific limits. If you exceed these limits, you are more than likely to end up with a basketful of bent valve-train components and connecting rods.



Cut-away view of Shorrock supercharger clearly shows vanes in their carriers. Intake port, not shown, is positioned at top of casing, opposite outlet port to manifold.



Schematic drawing of Shorrock blower reveals Judson's close resemblance. Shorrock having no dealers in the U.S., parts and service could be a problem.

Another vane-type blower is the Shorrock, made in England by Shorrock Superchargers Ltd. This, like the Judson, is a positive displacement, eccentric drum, vane compressor.

The Shorrock is virtually inaudible at all speeds. It affords added power throughout the engine range, resulting in improved acceleration, better hill climbing, and superior top-gear performance. Available brake horsepower increase varies between 30 per cent and 50 per cent, depending on the type of engine. Boost is 6 to 7 pounds per square inch. Fuel consumption is raised slightly—10 per cent to 15 per cent, which is not unreasonable in view of the enhanced performance.

Lubrication of the supercharger is by pressure feed from the car engine oil supply. Consumption is about a gallon per 3,000 miles.

Installation takes about half a day. Everything needed is supplied—carburetor, manifold, brackets, pulleys, and belts. The belts have a life expectancy of about 15,000 miles.

Shorrock blowers are made for many British cars, including Morris Minor, MG Midget and Y, Ford Anglia and Prefect, Standard "8" and "10," and Hillman side-valve models. Shorrock has no dealers or distributors, but deals with customers direct. Inquiries should be addressed to Shorrock Superchargers Ltd., Empress Works, Walsall Road, Willenhall, South Staffs, England.

If you happen to have a British Ford 1172cc 100E engine that wants hotting up, you can boost the brake horsepower output to 61 at 6,000 rpm by installing a Power Master overhead inlet valve conversion kit. This increase is obtained with the stock cam and the original exhaust system, and without alteration of the ignition setting. Compression ratio is raised to 8.5:1, and carburetion is by

Power Master head for English Ford engine increases hp to 61, usable revs to 6,000, by providing overhead intake valving, higher compression ratio, twin Solex carburetors.

twin Solex 32PBI's. Head and components are aluminum. The basic price, not including the carburetors, is $295. Extra modifications for competition use include camshaft, larger exhaust valves, lightweight hollow magnesium pushrods, and exhaust header pipes; in this form, the unit delivers in excess of 70 bhp.

The kit includes all necessary parts, such as pushrods, throttle linkage, oil line, blanking plates, bolts, head gasket, and 10mm spark plugs.

U.S. importers are Foreign Parts, 811 Scarsdale Avenue, Scarsdale, New York.

"HOT" CAMS

By modifying the valve timing, a radical camshaft may work startling changes in certain performance characteristics.

This book is not intended as a hop-up manual, or a treatise on the theory of the internal combustion engine. You probably know how the fuel-air mixture gets into and out of the cylinder. Briefly, in a four-strokes-per-cycle engine, the intake stroke begins with the piston at its highest point in the cylinder. This point is known as top dead center. As the piston starts its downward travel, the intake valve opens, allowing the fuel mixture to flow from the carburetor and the intake manifold into the cylinder. During this interval the exhaust valve is closed. When the piston reaches its lowest point in the cylinder (bottom dead center), the intake valve closes. As the piston rises again, it compresses the fuel mixture. When the compression stroke ends, the spark plug fires, igniting the mixture, and the explosion against the piston head sends the piston downward on its power stroke. Both valves are still closed. At the end of the power