

# SPORTS CARS ILLUSTRATED

 C.D.C.

JULY 1955

35¢

For The Sports Car Enthusiast

**Tuning the MG  
For Competition**



**Chuck Wallace Reports  
On the New Jag 140**

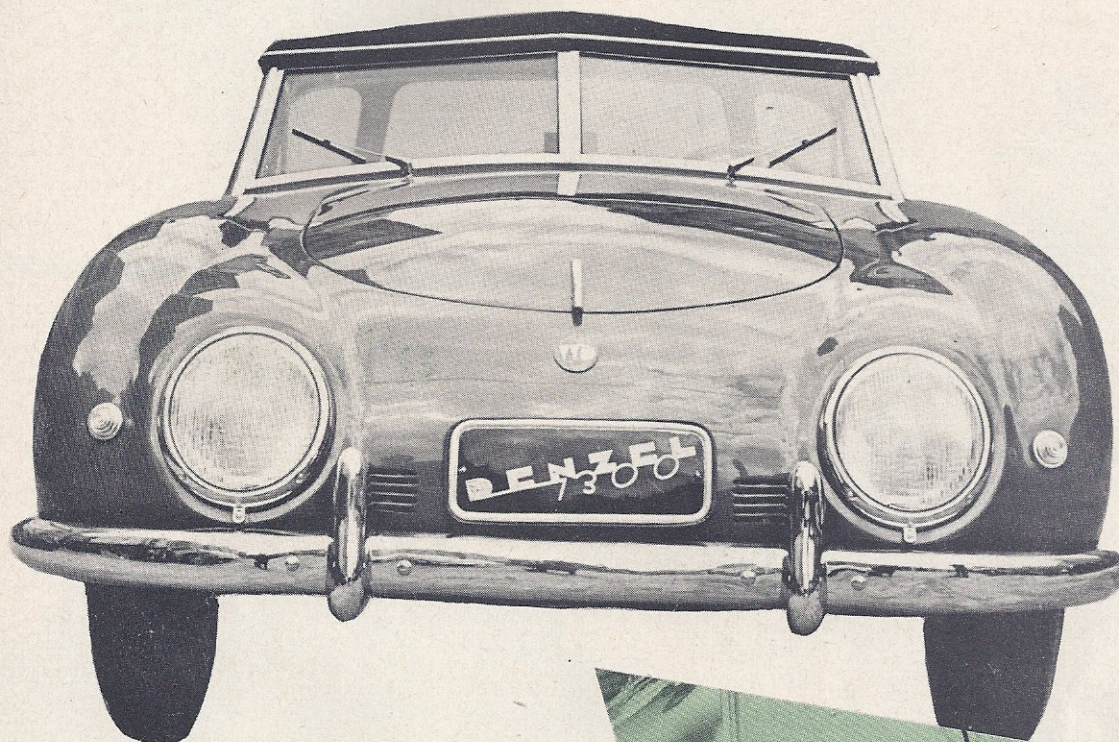
**A Day With the Lotus  
At the Sebring Race**

REG. U. S. PAT. OFF.



denzel's

# VOLKSWAGEN

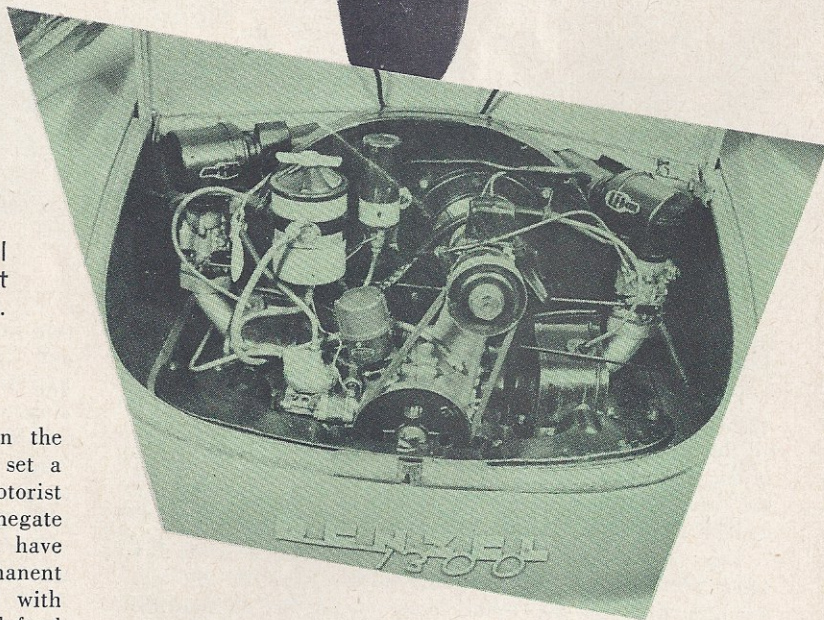


mit  
sturm

BY F. H. BAER

In the 1.3 liter model "der sturm" hits 100 mph. plus.

Rear view of the Denzel with 1.5 SS powerplant shows major revisions.



**S**INCE the Volkswagen made an appearance on the American scene some three years ago, it has set a record in endearing itself to the American motorist that its none too pleasant exterior would seem to negate at first glance. There are now owners that would have "nothing else" and a hard core of perennial and permanent fans have developed. They are not only satisfied with the VW, but ready to do all but manly battle to defend the seemingly indestructable Deutscheslander when it is under attack from the cognoscenti as being strictly an economy car rather than a lusty sports machine.

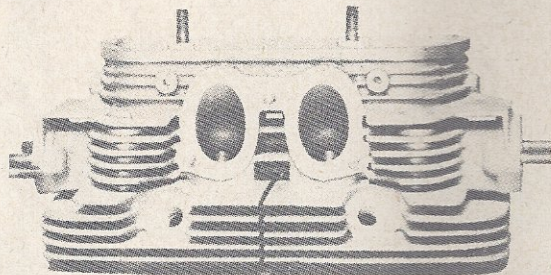
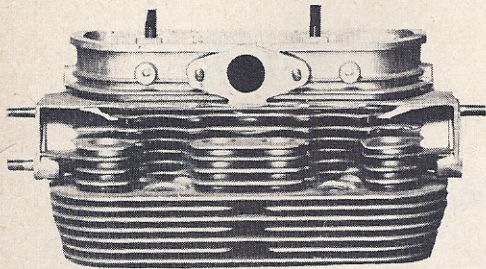
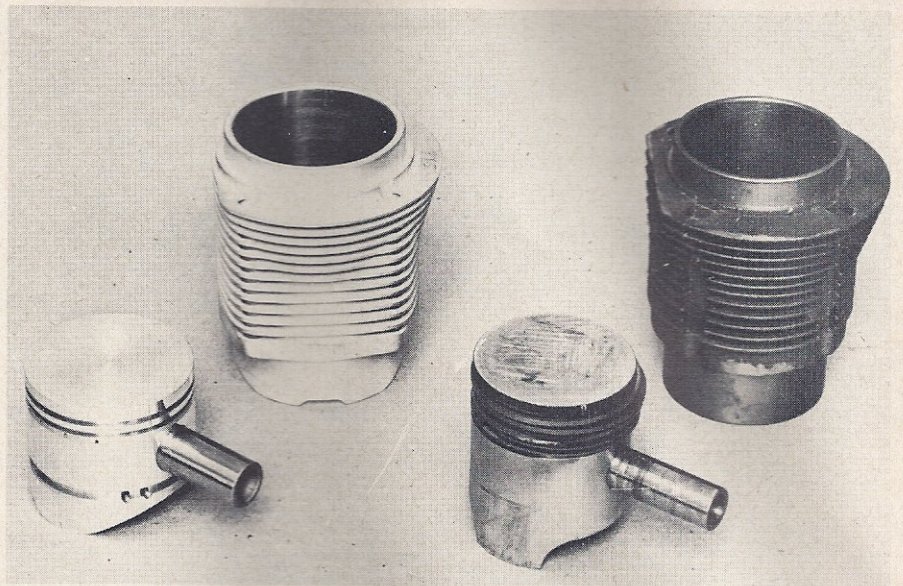
This same hard core of enthusiasts has counterparts the world over, and for years the mark has served as one of the most popular and successful bases for "specials" and prototype racing cars in central Europe. Here the art of reworking the more than sturdy components of the VW have reached a height comparable only to the revisions

practiced on the Model A in this country, and the undisputed master of reworking the "Peoples Car" is an Austrian . . . Wolfgang Denzel.

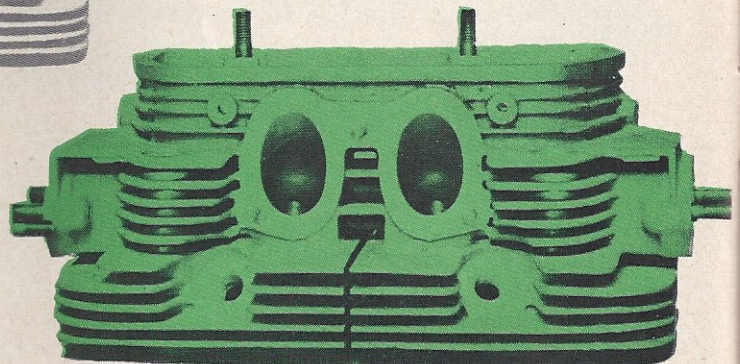
Denzel has been doing things to the VW that have proved successful against the most strenuous competition that Europe has to offer in the small economy car field. He has developed such consummate skill at it, that he's moved his machine into a class that made the winning Jaguar in the XVII Criterium International des Alpes work to beat



Among many exchange parts included in the Denzel car are new aluminum cylinder barrels and matching pistons.



The new Denzel cylinder head insures better breathing and performance than is possible in stock Volkswagen assembly.



the rugged little car that has only a bare third of the Jag's horsepower.

This, of course, will be past history to the Volkswagen addicts in the United States. The really intriguing part of the idyll is that this same treatment is now available in kit form to anyone with a VW here. You can hop up the family transportation or build a complete "Super Sports" car with distinctive bodywork to go aracing in.

This conversion is not only complete, but it gives the same performance that took the Alpine Cup in the last five runnings of the event, and should be of extreme interest to the American sports car driver especially, since the new SCCA ruling drops 1300 cc. cars into Class G.

The stock Volkswagen, as turned out in mass production in the Volkswagen Werke of Wolfsburg, West Germany, comes with the well-proven engine of 1,190 cc. piston displacement. Top yield is still a modest 31 hp. at 3,400 rpm., achieved with a compression ratio of 6.1:1. This gives an overall weight/power ratio of 50.160 lbs./hp. and reaches a peak of 68.343 mph.

In Denzel's Vienna Works, the standard cylinder bar-

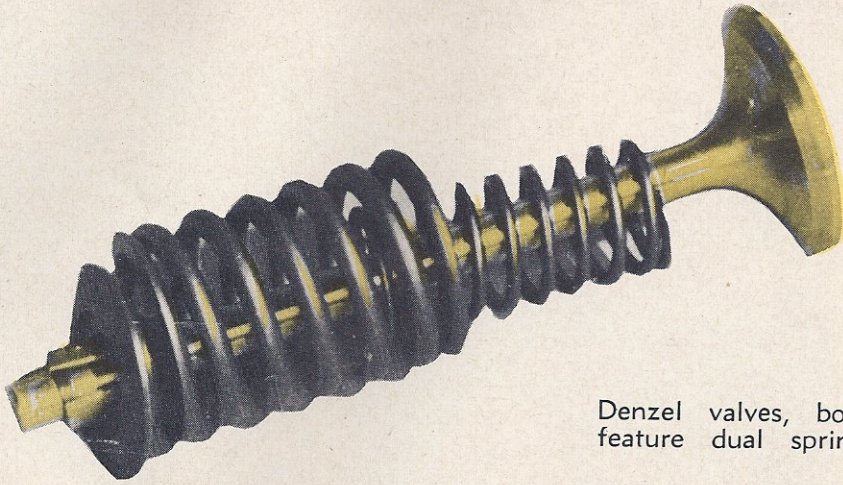
rels are taken off, along with cylinder heads, carburetor, and intake manifold. In their place, aluminum cylinder barrels with hard-chromed interior are fitted with matched aluminum pistons. Bore of the replacement cylinder increases the stock Volkswagen's 3.003 inches to Denzel's 3.042 inches. Fitted to these cylinder barrels are the special cylinder heads that play the greatest role in boosting the output of the Denzel-treated engines.

The cylinder heads, two per engine, are designed with oversized aluminum cooling fins, and a compression ratio of 7.7:1. They feature new intake passages 192 per cent larger in area than the stock Volkswagen, and a 143 per cent larger exhaust port area.

The patented combustion chamber has been changed from the sharp roof-like stock design to a tub-shaped one providing a better flow of fuel-air mixture and of exhaust gases and permitting higher compression. Most important here, however, are the valves.

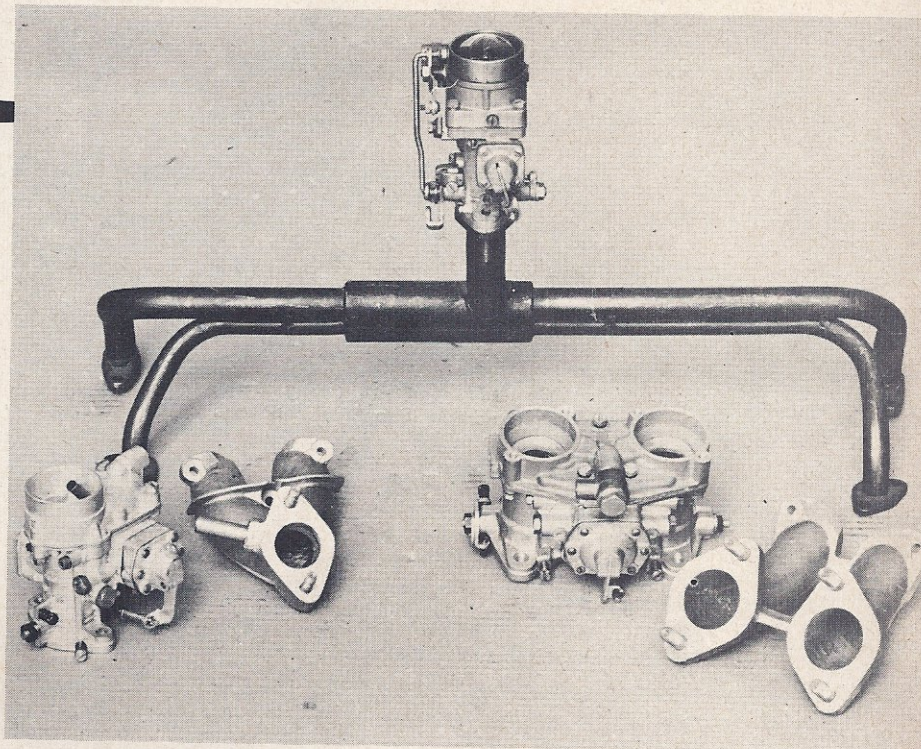
Intake valve seats are increased 180 per cent in diameter, while the exhaust valve seats are 137 per cent larger in the Denzel cylinder heads. Steel insert rings are shrunk





Denzel valves, both intake and exhaust, feature dual springs to prevent bounce.

Denzel uses two-carb, front left, and four-carb systems. On top is stock car unit.



into the aluminum head and provide correct seating for the valves which are well fitted with dual springs to prevent bounce at peak rpms.

With the cylinder head fitted to the cylinder banks, one Solex-32 PBIC carburetor serves each bank of cylinders replacing the stock VW system.

The stock Volkswagen camshaft is used in the Denzel engine conversion due to the sufficient sharpness of the stock cam lobes, but the crankshaft of the Volkswagen has been replaced by a one-piece, billet-turned steel crankshaft fitted with counterweights, drilled for static and dynamic balancing. The standard Volkswagen crankshaft is not capable of withstanding the higher torque in the 3,000 rpm. range. At the same time crankshaft stroke is boosted from the stock Volkswagen's 64 mm to Denzel's 67 mm (or 2.613 inches).

With these parts mounted the Denzel yields 52 hp. peak at 4,750 rpm. As compared to the stock Volkswagen engine, this represents a 67.7 per cent boost in horsepower. Maximum torque also is steeply increased, from 55.694

foot-pounds at 2,000 rpm. to 61.470 foot-pounds at 3,500 rpm., a 10.3 per cent build up. Meanwhile the power/weight ratio changes from the stock Volkswagen's basic (dry) 50.160 lbs./hp. to 32.790 lbs./hp. This 52 per cent improvement helps stretch the top speed from the Volkswagen's 68.343 mph. to the Denzel's 80.770. These increases in efficiency result in a fuel consumption boost from 28.750 mpUSg. to 30.660 mpg.

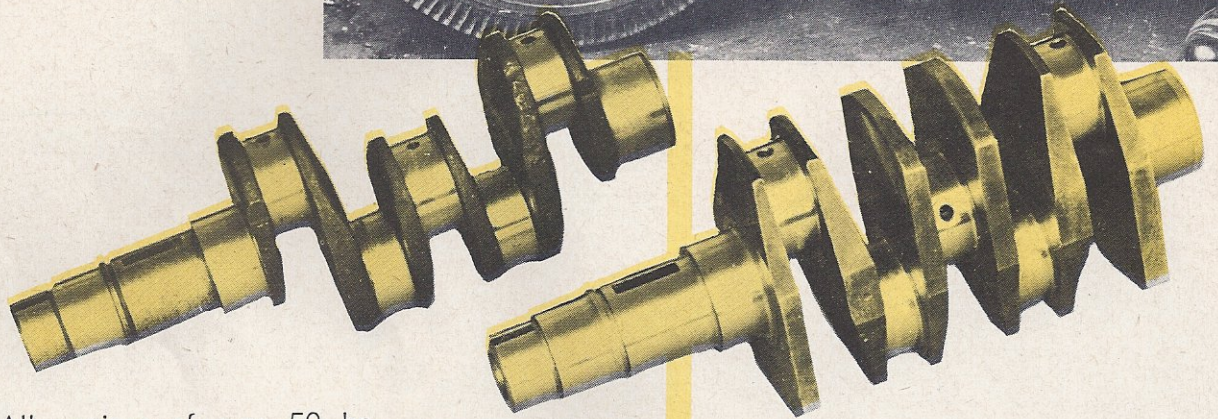
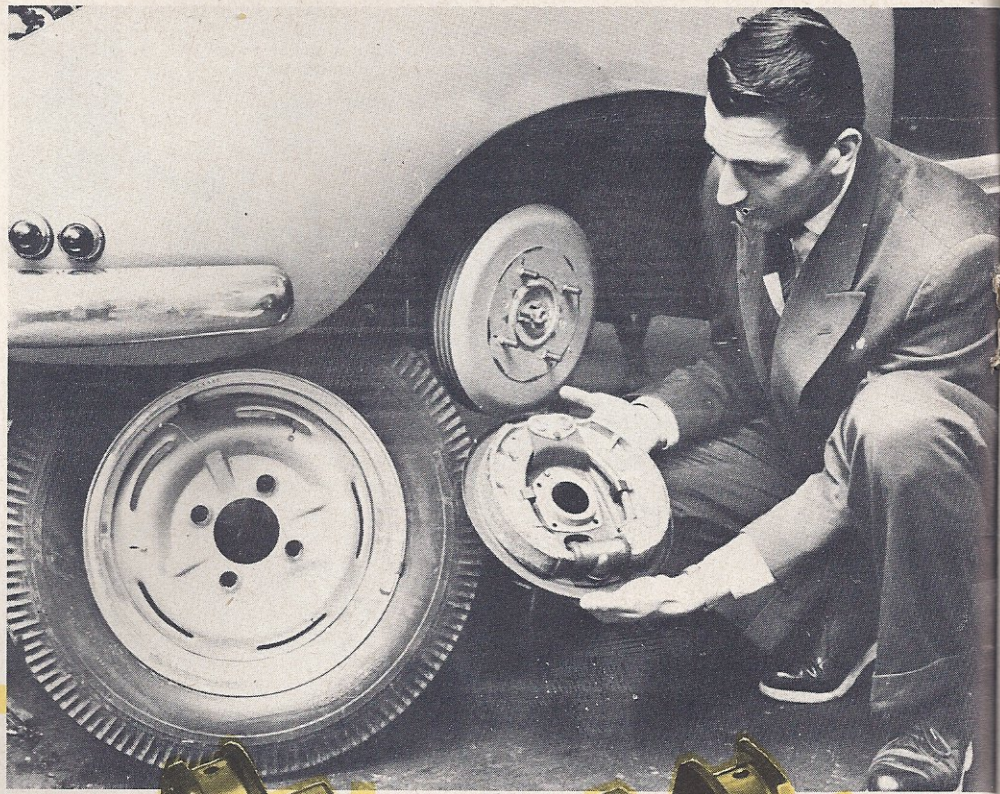
Accompanied by specific and easy-to-follow instruction sheets for making these conversions possible, Speed Crafts Enterprises, of Exton, Pennsylvania, is now beginning to market a kit containing all these parts.

For those desiring a "poor-man's" conversion, Denzel also has a solution. Leaving the stock crankshaft in place, and retaining the stock Volkswagen cylinder barrels, you add the cylinder heads and the 2-carburetor system and end up with a hp. yield of 48 at 4,500 rpm. and a compression ratio of 7.2:1. A 10 mph.-plus over the stock VW is assured with this kit in place.

With engine rpms. increased from 3,400 in standard



Stock Volkswagen braking was proved inadequate at high speeds. Larger units of aluminum were adopted.



All engines of over 50 hp. output were fitted with a billet-turned steel crankshaft.

form to 4,500 or 4,750 rpm. in the Denzel, and with the torque considerably boosted, the Denzel takes off like a scared rabbit. While the stock Volkswagen needs more than 42 seconds from zero to 60 mph., the Denzel-tuned Volkswagen needs but 22 seconds, giving it an edge of 200 per cent.

Engine changes are not the end-all of the Denzel conversion for Volkswagens. There are customers who are not interested in using the fourth gear as an "overdrive" but do want a few more miles at the top end. Here three to four mph. can be squeezed out in excess of the 80.770 mph. of the "normal" transmission by adding a more direct top gear.

To offer customers more than the basic Volkswagen conversion, Denzel has now concentrated on two major sports car lines, combining Denzel-treated Volkswagen engines with a chassis, body, brakes and wheels of his own. Both

of these are 1,300 cc. displacement. Both have the same chassis, a single box-shaped central beam, connected by tubular rails and reinforced by steel angles. With seating for three adults the complete vehicle weighs in at 1,320 lbs. (dry) with 596 lbs. on the front wheels and 726 lbs. at the rear. Medium gauge light aluminum is used for the body and weight balance is achieved by fitting a giant-size (16 USgallon) gasoline tank in the front compartment, together with battery, spare tire and tool kit.

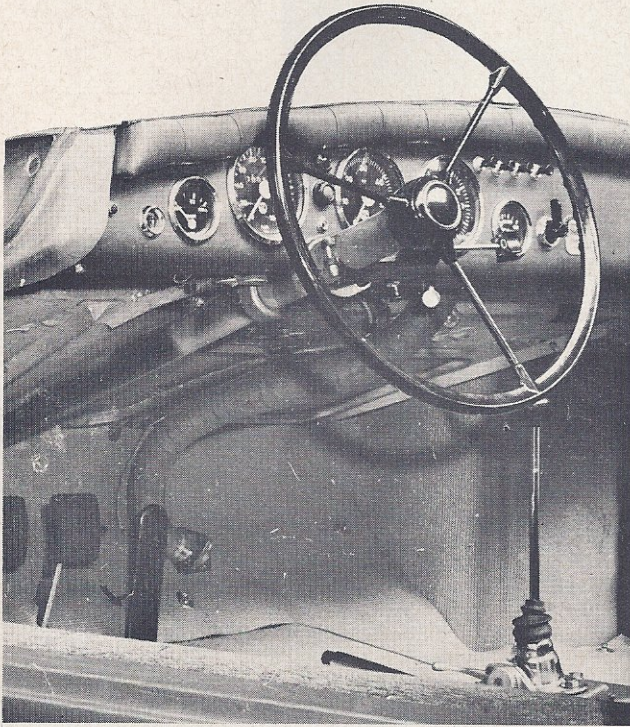
The aerodynamic shape of the Denzel roadster body offers least possible wind resistance, and with the top up, the full-width rear windows permit excellent all-round visibility, while a reasonable luggage space (larger than most sports cars) is provided back of the seat.

As the Volkswagen cast iron brakes are too heavy, and not large enough in lining area for the 100 mph. top speeds possible in Denzel cars, special new brakes have

*SPORTS CARS*



Denzel dash includes passenger comfort fittings in addition to necessary indicators for driver.



Car	I	II	III	IV	Rear end
Volkswagen 1.....	3.60	1.88	1.22	0.79	4.375
Denzel 1.....	2.54	1.81	1.25	0.875	4.375

This closer gearing in first and second gear provides rapid acceleration as shown.

Gear	52 hp. model		61 hp. model	
	4,750 rpm.	5,500 rpm.	5,400 rpm.	6,000 rpm.
I (mph.) ....	31.086	36.039	35.417	39.767
II .....	43.496	51.574	49.709	56.544
III .....	67.108	77.671	71.458	78.913
IV .....	96.312	—	102.587	—

The first column of each model indicates the top speed in a specific gear, at the rpms. corresponding to maximal hp. output, while the second column of each model shows the highest speed relative to the individual gear, corresponding to the maximally possible rpms. The difference between these two columns for each model is of interest in racing only, however.

been developed. They're made of aluminum, heavily finned on the outside for better cooling and fitted with a cast iron lining. The effective brake area has been increased by 140 per cent over the stock VW and will really bring things to a halt.

Along with the improved brakes special aluminum disk wheels, stamped out and slotted, further decrease the weight and aid in cooling of the drum.

With the 52 hp. engine the "1.3-liter Sports" can be used for everyday driving as well as for competition. With top speed reaching up to 96.305 mph. or 155 kilometers per hour it's a potential winner. A far "hotter" version is the "1.3-liter Super Sports" with a sharp Denzel camshaft fitted instead of the stock Volkswagen unit. As a result the engine peaks at 5,400 rpm. to develop 61 hp. Performance-wise, this model reaches a guaranteed top of 102.510 mph. or 165 kilometers per hour.

The transmission in both models has been changed, too. Instead of the basic Volkswagen's synchromesh gearbox, the Denzel transmission is straight cut in the lower gears. As to ratios, the table shows the changes.

Another problem in hotting up the VW is the cooling. The stock Volkswagen's pulley is geared for best cooling at any given engine speed up to 3,400 rpm. When these turns are almost doubled, the blower speed is too high to

catch any air in the duct, necessitating somewhat decreased speeds to get the required amount of air into the ducts and still permit a steady cooling level in the engine. Since the generator is directly driven from the fan belt, too, these excessive rpms. would create difficulties in the designed charging rate and regulator unit.

As to the future, Denzel's entire interest lies in producing enough conversion kits to fulfill world-wide demand, and also to build enough of the 1,300 cc. Sports and Super Sports models to reach production classification. But Denzel (like anyone else in this field) keeps research racing ahead at full speed.

In the 1.3 liter class, 1956 may offer a reworked carburetion system employing one carburetor per cylinder and aluminum connecting rods to decrease engine weight, and permit even higher rpms. to give an output of well over 70 hp. and at least 170 to 175 kph.

There's talk too of a 1.5 liter engine also fitted with the two double-throat carburetors and aluminum rods. Top speed for a 1,300 pound Denzel car fitted with this engine should exceed 115 mph., and have about 85 hp. at 6,000 rpm. to draw on.

Actually prototypes of both these engines are finished and waiting for the 1955 competition season. When the bugs are ironed out, they'll be offered to the public.

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