RIDE IN THE RSK

PHOTOGRAPHY: WEITMANN

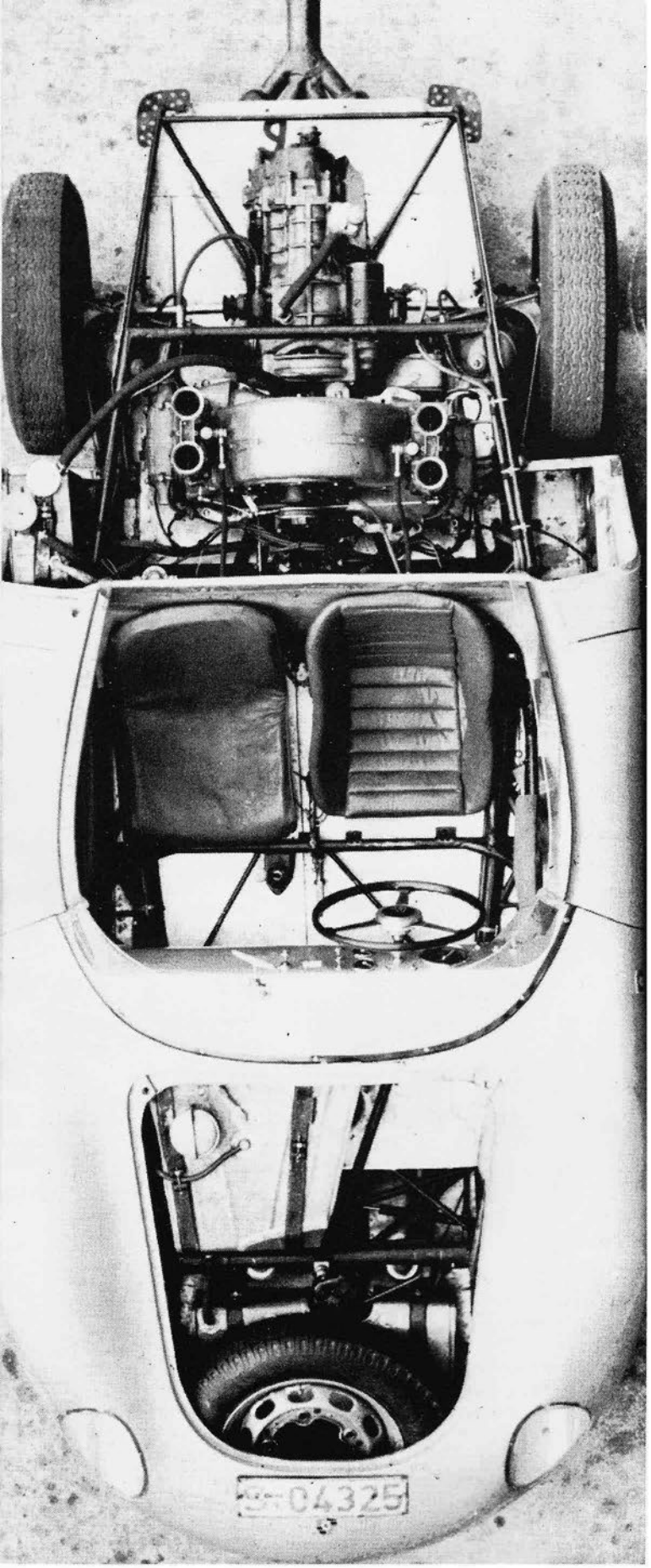
by Richard von Frankenberg

► In at least one respect the Porsche Spyder is a rare chapter in the history of sports cars. It appeared on a race track for the first time in August of 1953. Yet after six years of development the Spyder – and especially its engine – looks virtually unchanged to the layman. This isn't uncommon in the field of passenger car design, where models are continued year after year with identical exteriors and engines that are or at least look the same – think of the Citroën 2 CV, the VW or many Opel types. But in the realm of racing sports cars, where performance is all that counts, it's almost unheard-of. Comfort, resale value, economy, amortizing the costs of tools – none of these viewpoints from passenger car construction has any meaning here. Thus all the firms that build racing sports cars change designs frequently and fundamentally to be able to "keep up" with the need for constantly improving performance.

Naturally the Porsche Spyder has also been altered and improved a great deal in years past, but often in ways which are invisible and which leave the basic design untouched. How and when did it originate, anyway?

It was clear to Porsche engineers in the Summer of 1952 that the production pushrod 1500 cc engine wouldn't be competitive much longer in international racing. For the Borgward sports cars were coming up strongly at home and the Osca – first with 1350 and later with 1500 cc engines – was walking away from Porsches abroad. As a result the first plans for a new engine were completed in late Summer of 1952. The bulk of the design work was handled by Dr. Fuhrmann, in the Porsche *Büro*, while significant stimuli also came from Ferry Porsche himself.

Named the Type 547 (every design carries its own number through the design offices), this engine was fitted with four overhead camshafts, which were driven by shafts and bevels. Like the normal Porsche engines, this was an air-cooled opposed four – thus two of the overhead cams ran along each side. From the beginning the engine had double igni-



Half-dressed RSK reveals new-type A-frame rear suspension. Chassis changes have been most responsible for improvement in lap times of Porsche sports-racers.

tion: two plugs per cylinder, two distributors and two coils. The two distributors were driven by extensions of the two upper (intake) camshafts. Today they're placed in a "V" and driven direct from the crankshaft. Unlike the normal Porsche engines, the 547 had a double-entry cooling blower, which means that the blower's scoops drew air from both sides. Two dual-downdraft carburetors brought the mixture in. In the six years that the motor's run, they've experimented back and forth between Weber and Solex carbs. At an original compression ratio of 9 to 1 the engine developed from 108 to 110 bhp (DIN) at about 650 rpm, the limit being about 7500.

If I'm not mistaken, the 547 engine ran for the first time on April 2, 1953 on the test stand in Zuffenhausen. This development was kept completely secret. In Spring of 1953 Porsche began to enter more factory teams in sporting events; until then the works had only sent light-alloy coupes to Le Mans, and had occasionally taken part in the Liege-Rome-Liege rally. But the Spyder with the four-cam engine wasn't yet available for the first races of the 1953 season. At the Eifel races it was Helm Glöckler who won for Porsche, but with a Spyder that was still powered by a hopped-up 1500 Super engine.

Then came Le Mans 1953. It was there that I first drove a Spyder which, if I remember correctly, wasn't yet called "Spyder". It was the Eifel Race car, though with an engine adjusted to normal gasoline to give just 78 bhp, fitted with a little coupe top which provided very poor vision and practically no ventilation – we won't even mention getting in and out. In any case the two cars (driven by Hans Herrmann/Helm Glöckler and Paul Frere and myself) were timed at 122 and 123 mph on the Mulsanne straight, speeds which are pretty respectable for 78 bhp and which show how good the car's streamlining was. Helm Glöckler and I drove one of these cars – open – in the Liege-Rome-Leige rally. The Belgian papers wrote: If these two Germans can stand 91 hours in this car and get back to Liege, they're the heroes of the rally. We failed to become heroes. Early in the third night, just as it began to rain, at Ponte di Legno in the Dolomites I leaned this Spyder rather ungently against a wall.

Next came the Grand Prize of Germany, which in 1953 was accompanied by a sports car race. By using alcohol the factory had extracted 98 bhp from the 1500 Super engine; that was the limit. With such an engine in the Spyder, Hans Herrmann turned a best lap of 11:02. During practice murmurs rippled through the paddock: Porsche has a new car here. Hans Herrmann made a few trial laps, and racing manager Huschke von Hanstein also took the wheel. The hood was never opened, and the Porsche technicians only shrugged the whole thing off. Ferry Porsche himself was there, for this was the first Spyder to be powered by the 547 engine.

In the Spring of 1954 at Hockenheim I drove this particular Spyder for the first time – it was called that then, after the American representatives had explained that this thing had to have a pretty name. Porsche had invited a number of the better German drivers to a day of trials, to enable them to choose a factory team. On this day it rained at Hockenheim. The three fastest on that day drove the works entries, together with Huschke von Hanstein, during the 1954 season. Hans Herrmann had the best time, then myself, then Helmut Polensky. Count von Trips first drove the Spyder in practice at Le Mans in 1955, and went very quickly from the beginning.

With the 1954 Spyder you could turn Nürburgring laps of between 10:50 and 10:55. In the hands of Grand Prize drivers, the RSK Spyder of today reaches the 9:50 mark and even a bit below, which represents an improvement of about 10 percent over 1954/55. In those days the very best time at the Hockenheim ring with the old Spyder was 2:33, while today we're closer to 2:21 and 2:22. This is an improvement

of only about 7-8 percent. There's a difference because roadholding is much more important at the Nürburgring than at Hockenheim, and it is in this area that the car has improved enormously in the intervening years.

The first small step was the stiffening of the frame of the old "550 Spyder" with additional braces along the sides. Entered by the factory from the Spring of 1956, the RS Spyder had a completely new tubular space frame, while the RSK, tried experimentally in the Summer of 1957 and relied upon exclusively in 1958, had a completely different front end layout. Because the two upper frame tubes ran diagonally, forming a "K" structure, this was referred to as the "K axle". Porsche soon returned to a parallel tube arrangement, but the "RSK" designation was retained. To be a stickler, then, we have a car before us with an inaccurate type name. The RSK's rear suspension was fundamentally changed in 1958, with a switch from the traditional torsion bars to coil springs with concentric tubular shock absorbers (History and structure of the RSK or Type 718 are detailed in SCI, October, 1958, and the 550 Spyder in February, 1957 – Ed.).

Let me spend a little more time with this topic of roadholding. The old 550 Spyder was a most drastic oversteerer, an automobile that "came around" relatively early at the back if you were a shade too fast in a corner. It behaved very honestly in this range of breakaway, however, and was easy to catch and correct. In principle the RS had the same characteristics, with the exception that its tail end broke away quite a bit later. This motion showed up clearly, and here again you could correct relatively easily with opposite lock and application of throttle. Today's RSK is still describable as an oversteerer, whose steering is so close to neutral, however, that in certain situations (for example downhill on a low-friction road surface) it understeers. And since it gives no advance warning of breakaway, right up to the last instant, in my opinion the RSK is somewhat more difficult to drive than the RS. Or to put it another way it's no longer so carefree to drive, precisely because – and this may sound paradoxical at first – it has such fantastic roadholding, in the sense of gripping the surface.

On the other hand, on the basis of its power/weight ratio the RSK belongs to that class of cars that's steered about 70 percent with the steering wheel, and 30 percent or more with the accelerator – applying just the right amount of power and feeling for the point of incipient wheelspin at the back. With such power and light weight you can convert understeer to oversteer as required, by applying enough gas at the right time to spin the rear wheels at a faster rate than the front wheels are sliding out. Dry, the RSK carries about 7¼ pounds per horsepower. The engine outputs vary between 150 and 160 bhp (all DIN horses here), tending more toward 160 than 150. For the private cars the factory specifies 148 bhp (165 SAE!), but most of the customers' engines actually deliver somewhat more than 150. Very few factory engines produce more than 160 bhp, even when tuned for shorter races. The highest figures yet recorded on the dynamometer are 161 and 162.

In 1954 the gearbox was a normal four-speed unit. Only as a test, I drove a car with a five-speed box in the Tourist Trophy in September, 1955; this new box was standard on the Spyder from 1956 on. The RSK still uses it today, although a six-speed unit has now been developed for the Formula 2 car (see SCI, February, 1960–Ed.). Actually the RSK's five-speed transmission houses only four fully usable speeds, supplemented by a so-called starting gear. Possessing its own little auxiliary housing, the latter isn't synchronized and, like reverse gear, can only be engaged by passing through a lockout on the gate. Naturally the shift from the starting gear into second takes substantially longer than the normal change, because you have to pass over the lockout to get back into the main gearbox again.

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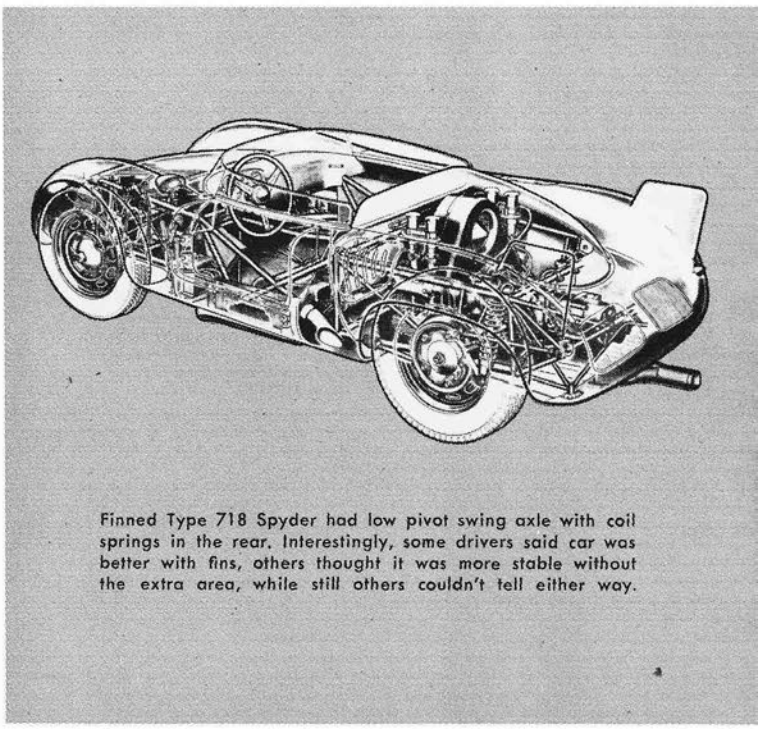
Richard von Frankenberg holds it steady at 7500 while he has his picture taken by photographer Weitmann. New RSKs demand greater driving skill than earlier cars because they are faster.



Finned Type 718 Spyder had low pivot swing axle with coil springs in the rear. Interestingly, some drivers said car was better with fins, others thought it was more stable without the extra area, while still others couldn't tell either way.

Sans passenger, von Frankenberg tries really hard at the Hockenheim Ring. He has driven all the Porsche Spyder types from the 550 to the A-frame rear suspension cars being run now. These cars make a normal Porsche road coupe feel like an old, panting Volkswagen.

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Between second and fifth speeds the gearbox is faster and easier to shift than on any passenger car that I know of. Even from third to fourth gear (which corresponds, in position, to second-to-third in a normal four-speed box), with no chance of a missed shift, you can whip through with astonishing speed, comparable only with the extremely short shifting times of a foot-shifted motorcycle gearbox. While the box of the normal Porsche makes a little noise if you rip right through from first to second, here you can move from second to third in the same way with no misgivings—presupposing that you can move the accelerator and clutch quickly enough, these being manual—or, more exactly, pedal—motions that can be learned. The transmission is a joy, also, because the shift lever "falls readily to hand" and because the shift pattern is much more compact than on a passenger car. These things are most intensely appreciated when—as during our acceleration tests—a hillclimb final drive ratio is installed which, going flat out, calls for engagement of fifth gear after four city blocks from a standing start.

What's the situation with rpm? Racing engineer Hild told me I could rev the engine to 8500 without undue concern. I know that the engine won't be damaged by brief excursions in the lower gears into the range just above, between 8500 and 9000 rpm. "Engine" in this case means valve gear, especially the valve fingers. Revs over 8500 are naturally not allowed in a long-distance race. A "spy" ensures that the mechanics can tell at once how much a driver has demanded from his engine: a second needle on the tachometer remains at the highest rpm figure reached.

This may be the most astonishing comment: the engine isn't at all inflexible. To be sure it doesn't accelerate strongly from low rpm, and when you step on the gas suddenly at 2000 it usually gulps before it bites off a chunk of fuel/air mixture. With some baffles screwed into the exhaust pipe, as a muffler, you can drive in the 1800-2500 rev range in town without roughness, as long as warming-up plugs are fitted.

The acceleration is fascinating, much more for a passenger than for the driver, who always has the steering wheel to hold on to. The passenger is pressed back against the seat so firmly that he's unable to move for a few moments. But allow me to express this in figures. We chose the classic European acceleration distance, the kilometer (5/8 of a mile) from a standing start. I made the trials at Hockenheim, on the start-finish stretch with its slight grade of about 0.7 to 0.9 percent. On the first run, slightly uphill, I took the RSK to 8400 in the gears and up to 8500 in fifth. The gearing was just a shade low for the kilometer, so I couldn't quite hold full throttle over the last 300 yards. This took 25.8 seconds. Within the last year Erni Vogel made a record attempt in Austria with a Spyder

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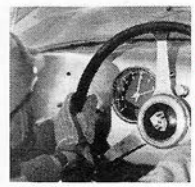

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and reached 26.01, which was a new Austrian record. The international record in the 1500 cc class has stood for a long time at 24.94 seconds (average of two runs), and was set in 1937 by a blown 1½ liter Maserati racing car on the *autostrade* near Florence. Naturally the postwar racing cars of the same displacement—the Alfetta, for example—were faster, but no one ever took the trouble to put them to the test.

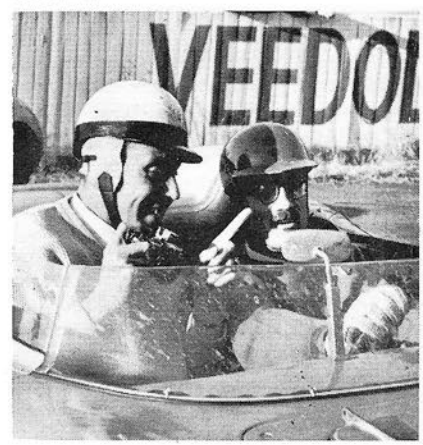
On the return run I turned the engine to 8700 in the gears and to 9000 in top which resulted (admittedly down the tiny grade) in a time of 24.5 seconds, 4/10 of a second under the record. The average, however, was 25.15 seconds. To be honest, I had previously made a practice start, then came the two violent starts for the standing kilometer—and then it was all over for the clutch. In accordance with one of the rules of the game within the Porsche racing team, applicable whenever one of us damages something in the powerplant, I gave the racing mechanics a case of beer.

We didn't make any top speed runs, but we do have one time taken at Avus in 1958. Only on a course like Avus or Rheims, with long, level straights and approaches, is it possible to get decent top speed indications. At Avus Behra's car, an RSK Spyder with 160 bhp, reached exactly 160 mph.

The pedals are naturally so arranged that you can "heel-and-toe" between brake and accelerator—which means simultaneous braking and revving for downshifts. What most race watchers and laymen don't believe: Although the transmission's synchronizers are near perfection, we never fail to double-clutch on downshifts in races as well as on test runs. You mustn't forget that a gearbox that has to carry 8000 or 8500 rpm is most grateful for a little assistance from double-clutching!

While shifting itself seems to go much more easily than in a passenger car, the pedal pressures required are substantially greater. A man who drives a Spyder for the first time and, as is suitable, shifts frequently and also brakes often from high speeds will find that his feet are weary after a very short time. The brakes are fascinating. Even at very high speeds they can produce deceleration between 0.9 and 1.0 g, and under favorable circumstances (high-friction road surface) even a hair more. If, at about 140 mph, you begin braking hard just 200 yards from a hairpin turn, you'll always make it around the turn with safety. If you experience this as a passenger in a Spyder, without ever having tried such brakes, it seems like a wonder of physics. When braking hard on a surface that has shallow ripples—ripples which you often can't see with an unpracticed eye—it's necessary to make gentle sawing movements at the wheel to keep a single brake from locking up. Generally they never lock up completely, but only for a fraction of a second which leaves a black stripe on the asphalt. But at high speeds that's enough to throw the car off its course.

You get through curves quickly with the RSK this way: Just at the point where you begin to turn into the corner you put your foot back on the accelerator and try to feed an amount of gas such that a) the back wheels won't spin, which would put the car sideways in an instant, and that b) the rear wheels have just enough slip to put the car into a gentle drift. If this is done right you won't have to apply much more steering lock, since the entire car will be placed at a tangent to the inner edge of the curve. You mustn't apply full throttle too soon coming out of the bend, for the RSK will reply with breakaway at the back which costs valuable fractions of a second—even though it's quickly recoverable by steering into the slide. When emerging from corners it's also imperative to keep an eye on the tachometer to avoid exceeding the prescribed rev limit. Since the RSK has no speedometer, a racing driver himself can never tell just how fast he's taking a certain corner. He can only tell with what revs and in what gear he leaves the curve; these are enough to decide how fast a lap he turns.



You must wear a pair of racing goggles. When I took the photographer, Julius Weitmann, for a nearly flat-out lap of Hockenheim, he elected to wear no goggles to be able to operate the camera more easily. Afterwards he told me that above 120 he could only open his eyes slightly, and that with great difficulty, since the air rushes back over the low windshield right at eye level.

If you step back into your 1600 Super Porsche after an afternoon of driving an RSK, you'll think someone's installed a Volkswagen engine while you were away. When you try the brakes you'll think they're broken—not because of the somewhat lower deceleration, but because the production car's pedals work so much more easily than the RSK's. Also, of course, the virtual silence of the Super (compared to the RSK) heightens the feeling that you're driving a very tame automobile.

With the RSK, or with any good 1500 cc sports/racing car, better times can be put up today on courses like the Nürburgring than 2½-liter Grand Prize cars could reach in 1954. Since the sports car's top speed must be lower, improved roadholding made the difference. This is a fine example of the effectiveness of engineering and of genuine technical advance—to the eventual benefit of the production car.

—R V F