

“Königswelle”: Mechanical Masterpiece

16/01/2025 It's not for nothing that the vertical shaft bears the royal name “Königswelle” (“king's shaft” in English). After all, it is the pivotal point for turning the Porsche four-cylinder boxer engine into a Porsche Type 547 engine suitable for motorsport.

The 16.8-centimeter-long part is visually unremarkable, but it creates an undeniably dynamic effect. At each end of the metal housing, there is a conical gear – what's known as a crown gear. Which is where the vertical shaft gets its German name from: “Königswelle,” meaning “king's shaft.” Its construction between the two crown gears allows it to steer two rotations through 90 degrees. More than 70 years ago, it played a decisive role in developing the four-cylinder boxer engine into a durable racing engine.

The background

The Porsche Type 60, better known as the VW Beetle, was created for Volkswagen under the direction of Ferdinand Porsche as early as 1934. A four-cylinder boxer engine was at work inside – at this stage

still without a vertical shaft. This wasn't constructed until the beginning of the 1950s by Ernst Fuhrmann who went on to become Chairman of the Executive Board of Porsche. He joined the company in 1947 and earned his PhD in 1950 writing about a "Cam drive for the control of high-speed combustion engines." From summer 1952, his expertise was applied to the modification of the boxer engine. The vertical shaft is key to the Type 547 Porsche engine.

The innovative valve drive via a vertical shaft created the basis for successful motorsport outings. In the case of the Type 547 engine, four of these shafts transfer the rotation of the crankshaft to the overhead camshafts in the cylinder head – an ingenious solution because vertical shafts can cope with higher speeds, guarantee precise valve control at full throttle, and are virtually maintenance-free.

Class victory at the Carrera Panamericana

The Type 547, which later became known as the Fuhrmann engine, was first put to the test on April 2, 1953. With its 1.5-liter displacement, the engine generates power of 110 PS at 6,200 rpm. The conventional production engine in the Porsche 356 1500 achieves a maximum of 70 PS. In 1954, when Porsche, as in the two previous years, took part in the Carrera Panamericana road race in Mexico, the 550 Spyder driven by Hans Hermann was powered by the Type 547. The result: the class victory. Based on the road race, the engine was given the moniker "Carrera." And the first sports car of the brand had a new model variant: the 356 A Carrera – the most powerful derivate of the product line.

The Porsche engineers continued to fine-tune the high-performance engine. The Type 547/6, for example, generated power of 135 PS at 7,200 rpm thanks to a higher compression ratio and a new carburetor. In 1956, Umberto Maglioli was the first to win the Targa Florio for Porsche in a 550 A Spyder fitted with the 547 engine. The outstanding engine's string of successes continued into the 1960s, in the latter stages with displacement of two liters and power of 180 PS in the 904 Carrera GTS. The construction was also used in Formula 1. By this time, Porsche had long since crowned itself a racing legend – not least thanks to the vertical shaft.

Info

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