

ATZ extra



ATZ 125
JAHRE

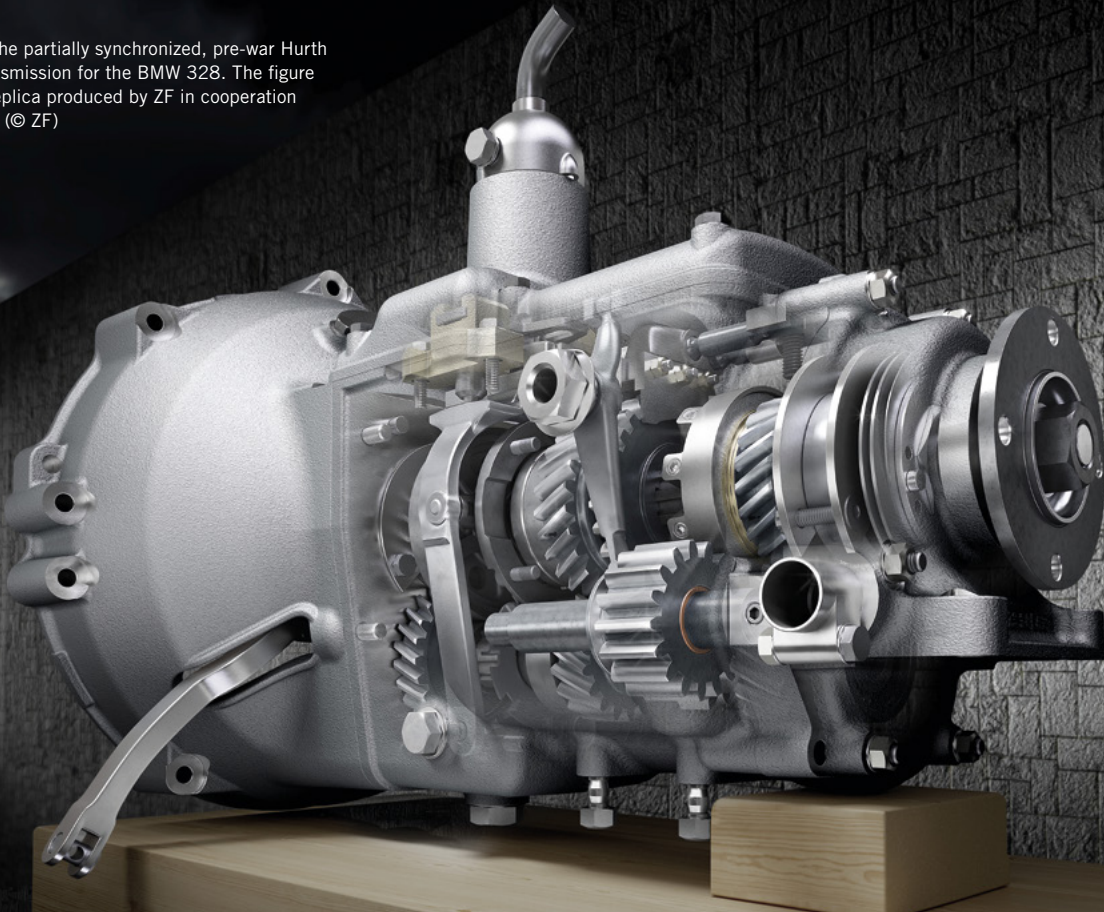
History Transmission

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Teeth and Claws

Right from the beginning, the history of automotive engineering has been all about transferring power from the engine to the wheels. In the early years, cars were driven by belts that connected the engine to the axle, but soon this task was performed by transmissions with gear wheels instead.

1937 The partially synchronized, pre-war Hurth G328 transmission for the BMW 328. The figure shows a replica produced by ZF in cooperation with BMW (© ZF)



It was not the first time in the history of humanity that a rotary motion had to be transferred to wheels, but it was the first time that this had happened in a car with a combustion engine. In 1886, Carl Benz solved the problem with a belt drive in his Patent Motor Car. The transmission consisted of a notched flat belt that ran from a disc on the engine to another three-part disc on the countershaft. Via a single lever on the left-hand side of the car, the driver could move the belt using a fork from the moving disc to the fixed disc and the brake disc and back again, **FIGURE 1**. The principle of “moving,” “not moving” and “braking” continues to work amazingly well today. How did Carl

Benz come up with this technology? “You simply need to keep your eyes open as you walk about and spot the right thing at the right time,” said Winfried A. Seidel, director of the Dr. Carl Benz Car Museum in Ladenburg, with a smile. “The system comes from factories where machines were driven by belts. The actual innovation in the Patent Motor Car is not the drive system, but the differential.”

Around a year after Carl Benz, Gottlieb Daimler made the next important contribution to automotive history with his “Motorkutsche.” But from the perspective of the powertrain, things only became really interesting around three years later. At the Exposition Universelle or world’s fair in Paris in 1889, which is etched into our collective memory because of the opening of the Eiffel Tower, Daimler and Wilhelm Maybach presented their steel-wheeled car. This was fitted with the first gear transmission to be used in a passenger car. The power was transmitted from the crankshaft via a friction clutch to the movable gears and then to a gear on the countershaft and via a movable gear to a fixed gear on the rear axle, **FIGURE 2**. Although the belt system continued to be used in some models for a while, soon the power was transmitted only by gear teeth and claws.

In 1926, Erich Friedrich Puls set up a factory and developed an automatic transmission for the Dixi 6/24 car. This development was presented at the Berlin Motor Show in 1926 and attracted a great deal of attention in the press. It was a three-speed gearbox where the gears were selected fully automatically and therefore the driver only had to operate the accelerator and the brake, as with today’s automatic transmissions. In its 7/1927 issue, “Auto-Technik” magazine, the predecessor of ATZ, reported on the new gearbox under the heading “The automatic Puls vehicle transmission.” The magazine had obviously discussed the new development with experts in advance: “After numerous colleagues were able to convince themselves that this transmission allows the car to move smoothly from a stationary position and accelerate up to its top speed without the use of a gear lever or gear selector and without the otherwise unavoidable engaging and disengaging of the clutch, we are now in a position to share some of the details of the design of this transmission in the accompanying illustrations,” **FIGURE 3**. The Pulsgetriebe company is still in existence today and is looking for a surviving example of the Dixi 6/24 with its automatic gearbox.

In 1939, ATZ reported on a “fully automatic variable-speed transmission” developed by the engineer Fritz Kreis and his “Gesellschaft zur Konstruktion und Verwertung automatisch-mechanischer Getriebe” (company for the design and use of automatic mechanical transmissions). The review of the gearbox is highly positive: “We have the impression that this design is in principle ready for mass production,” **FIGURE 4**. History does not report whether the transmission was ever used.

Frank Jung



FIGURE 1 The Patent Motor Car developed by Carl Benz in 1886 was the first car with a combustion engine; it was driven by a belt transmission (© Mercedes-Benz Classic)

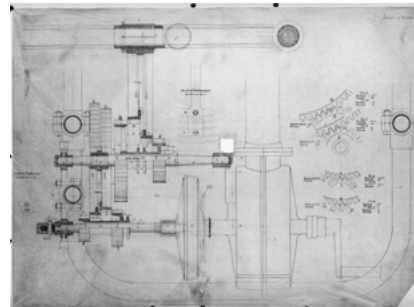


FIGURE 2 Drawing of the four-speed gearbox designed by Wilhelm Maybach for the Daimler steel-wheeled car in 1889 (© Mercedes-Benz Classic)

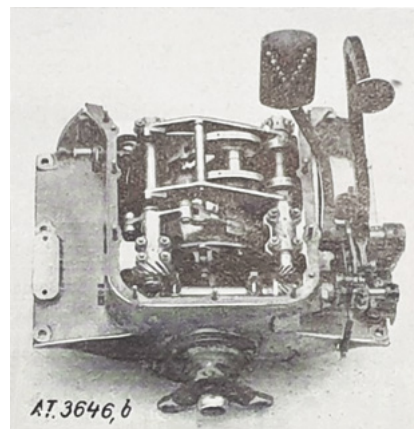


FIGURE 3 The Puls transmission was used in the Dixi 6/24 and a total of 15 of the cars were sold (© Springer Vieweg)

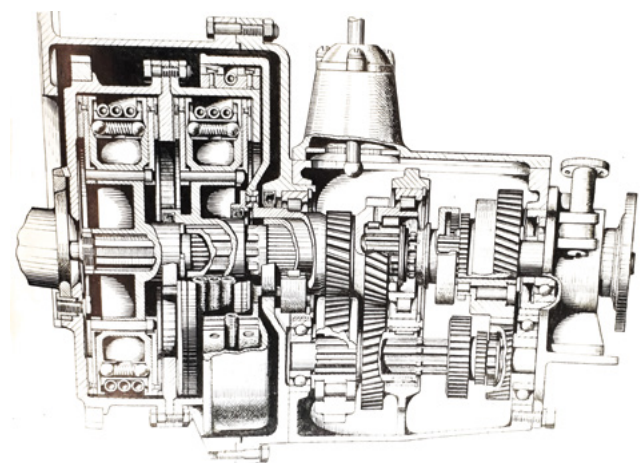


FIGURE 4 In 1939, the engineer Fritz Kreis presented his “fully automatic variable-speed transmission” which had three centrifugal clutches (© Springer Vieweg)

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