

The inventor Herkenrath and his self-adjusting chain sprocket

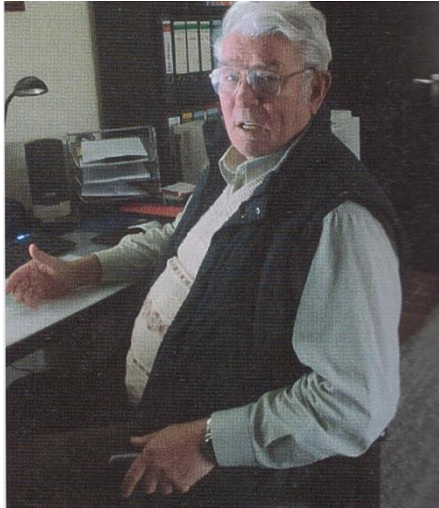
Taking stock after more than 13 years

In 1999, the Saarland-born inventor Karl Herkenrath presented in this journal the “self-adjusting chain sprocket” that he had been developing since 1992 and which was designed to help reduce wear on chains and chain sprockets resulting in a reduction of the operating costs of conveyor systems (1). Another claimed advantage was the reduction of noise emissions. In 2001, a pilot project came about when it was used as drive sprocket for a portal scraper conveyor in the coal-fired power plant in Ensdorf. This example, unfortunately the only one so far, shows that the chain sprocket has met the expectations over a period of 13 years and under rough operating conditions and can, therefore, be recommended for similar lifting and conveying applications.

Useful solution

In June 2001, an article that was titled “Odyssey of an inventor with patience and stamina” was published in the newspaper “Saarbrücker Zeitung” dealing with the application of an innovative self-adjusting chain sprocket on a scraper conveyor of the coal-fired power station in Ensdorf/Saarland. After an intensive search and detailed reasoning the design engineer *Karl Herkenrath* had eventually found a company that put his invention, that had been patented in 1994, to practical use in order to exploit its advantages. The self-adjusting chain sprocket distributes the acting forces evenly to all teeth. The conveyor belt runs smoother, chain wear is drastically reduced. The maintenance of the chain sprocket is possible without disassembly, and only the teeth need to be replaced. The chain producers, that had been contacted at that time, had not shown any interest in an invention that promised to extend the service life of chains. “These companies generate 90 % of their turnover through the sale of chains and only 10 % through the sale of chain sprockets”, analysed *Herkenrath* in the late 1990s and almost decided to drop the patents for financial reasons. It really was a godsend that the company Koch in Wadgassen (now operating under the name of FLSmidth Wadgassen GmbH) hit on the invention in connection with the construction of a conveyor belt at the power station in Ensdorf. At their own risk they took on the patent fees, drawings were made and the chain sprocket was custom designed and manufactured to specification. In 2001, it was put into operation on the conveyor.

Today, after 13 years of service, the chain, the chain pins and the self-adjusting chain sprocket yet do not show any signs of wear and tear. Everything that had just been theory demonstrated by the inventor by finite element calculations and based on a round link chain could now be confirmed in Ensdorf with the results achieved under actual conditions of practice. Also, adverse changes in the generation of noise from the plant have not been noted to the present day. As the power plant in Ensdorf is situated close to a residential area, the noise generation of the new conveying system was required to stay below the level that had been set by the environmental authorities. Experience has taught that scraper conveyors which are equipped with long link roller chains generate a constant “rattling sound” caused by the polygon effect of the chain sprocket. The significant noise level generated by the conventional chain sprocket would, at that time, have made it impossible for the conveying system in Ensdorf to take up operation without additional housing. This is why the decision was made to equip the scraper conveyor with the self-adjusting chain sprocket.



Still convinced of his invention: Karl Herkenrath

Sound measurements carried out by the technical control board TÜV Süddeutschland (assessment report no. L 4687) showed that no further sound protection measures were required.

Advantages and enhanced form

The inventor *Karl Herkenrath*, meanwhile 73 years old but young at heart, is happy that in Ensdorf, to the present day, no repairs caused by normal signs of wear and tear have been necessary neither on the chain nor on the self-adjusting chain sprocket. This has provided the evidence that the self-adjusting chain sprocket adjusts to the varying conditions of the chain and chain pins. Less repairs also mean less downtime, an aspect of utmost importance for the continuous operation of the conveying system.

According to *Herkenrath* another advantage of his invention lies in the fact that the self-adjusting chain sprocket can also be integrated retrospectively into any kind of systems such as conveyor systems and escalators with long link roller chains because the form of the teeth of the self-adjusting chain sprocket is almost identical to the tooth form of a conventional chain sprocket. The only difference is that “his” chain sprocket is characterized by an alignment of moving individual teeth which, therefore, can adjust to the different conditions with respect to wear and elongation. Every individual tooth can execute small pivoting movements which it transmits to the neighbouring teeth. Unlike it is the case with conventional chain sprockets, the force transmission does not only affect the first engaged tooth but several teeth at the same time.

In 2010, a new patent application for the self-adjusting chain sprocket in its enhanced form was filed with the German Patent and Trade Mark Office (*Deutsches Patent- und Markenamt*) and the European Patent Office under the title of a “self-adjusting drive sprocket”.

Herkenrath offers to provide expert consulting to all interested parties. Based on a drawing of the conventional chain sprocket and further technical specifications the inventor will submit a free quote for the operation of the self-adjusting chain sprocket. Contacts can be made by email to info@selbsteinstellendes-kettenrad.com or through the homepage www.selbsteinstellendes-kettenrad.com.



The “self-adjusting chain sprocket” in operation on a scraper conveyor.



Dismantled chain pins show no signs of wear and tear after a long period of operation (photos: KKK)