

Machine Tool Memories

Taking a Step Back Before Taking a Step Forward

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IMTS 2018 promises all the machine technology manufacturing has to offer.

From 3D printing to digital manufacturing, Chicago will keep its biennial promise to wow the manufacturing industry with the latest innovations and machine developments. If your career has anything to do with manufacturing and engineering, it's essential to spend six days at McCormick Place to see these technologies up close and personal.

Before seeking out the new and the noteworthy, however, it's equally as important to jump in the time machine and see how far manufacturing has come. A recent visit to the Henry Ford Museum of American Innovation, located in Dearborn, Michigan, helped remind this editor how different the manufacturing floor looked when the Ford Model-T was first being produced in the early 1900s.

In fact, an exploded Model T in 3D on display at the museum hints at the innovation and technology that would be applied, redesigned, and reimagined in the automotive industry for years to come. Just beyond that fascinating 1922 Model T, visitors will find a room full of machine tools—everything from lathes to gear cutters to drills and planers. Here are a few highlights:

A precision gear cutter invented in the early 1890s by Duane H. Church, Waltham's superintendent of toolmakers was on display highlighting the company's tradition of automatic machinery. Church's inventions were so precise that gauges and templates were not needed to produce interchangeable parts.

The Waltham Watch Company began its operations in 1854 and, through innovation, introduced a system of interchangeable parts. The Company developed machinery that could make watch parts so precisely that they were interchangeable with one another. This innovation served to catapult productivity and place the Waltham Watch Company on the international forefront as the first company to mass produce a complete watch under one roof.

A Brown & Sharpe Co. gear cutter from around 1850 helped demonstrate just how difficult and delicate gear cutting was at the time. Getting just the right angle so the gears would mesh smoothly took both mathematical knowledge and practical experience. This machine made the work easier and the product more accurate and uniform, because of the rings of concentric holes used to “index” or measure the different angles. Brown and Sharpe—founded in 1833—was one of the most influential machine tool builders and a leading manufacturer of micrometers and indicators.

If you're ever in Metro Detroit and have a day or two to spare, the museum and Greenfield Village are a great way to gather some historic context on engineering and manufacturing. In



An exploded Model T in 3D on display at the Henry Ford Museum of American Innovation.

fact, the Armington & Sims Machine Shop in Greenfield Village is a building that essentially provides support for a system of shafts and pulleys that distribute mechanical energy to rows of metalworking machine tools arranged along the building's length. According to the website, the machinists who worked in shops like this could tackle a wide range of jobs. It was machine shops like this that were the training grounds for many technological innovators in the 19th century.

I asked my 8-year-old son what he thought of the old gear cutters, lathes and drills on display at the museum. I was given the all-too-familiar shoulder shrug from a kid that would rather be playing baseball or Nintendo than looking at machine tools. In his defense, it was lunchtime and when an 8-year-old has seen one gear cutter, he's seen them all.

“They look old and dusty,” he finally shared his opinion. “I’m sure at the time they were good for something or they wouldn’t be in here.” (A fair and perfectly reasonable assessment)

Sources for this article include www.walthamwatchfactory.com, www.thehenryford.org and brown-sharpe.com. 