

The Turn of the Screw: A Brief History

BY KAREN BAXTER

It's easy to take the screw for granted. Most people don't even think about screws until they need to take the cover off of a toy's battery compartment or until an arm falls off their eyeglasses.

So, it may be surprising that in the wake of Y2K, when asked to write an essay on the most important tool of the millennium for *The New York Times*, author Witold Rybczynski, professor of urban studies at the University of Pennsylvania, chose the screw as his subject. (Rybczynski went on to write the book *One Good Turn: A Natural History of the Screwdriver and the Screw*.)

The origins of the screw can be traced all the way back to the Greek scientist and mathematician Archimedes, born in the third century B.C. Archimedes invented the first planetarium, the lever, the catapult and the compound pulley system. He also is credited with the creation of the hydraulic screw pump, which was used to raise water from a low-lying body of water to irrigation ditches.

Other screw-type machines like the olive press, which used Archimedes' helix design, were used as early as first century A.D. However, it wasn't until the 15th century that wood screws used as fasteners first appear in historical accounts. Around that time, gun and armor manufacturers began using them instead of nails to get a better seal between seams and joints. It was also in the 15th century that Leonardo da Vinci drew a sketch of a screw-making machine.

According to Rybczynski, the first screws were made by hand with files.

Because of the labor involved in their creations, they were expensive and not used around the house or in large quantities.

That began to change when English instrument maker Jesse Ramsden invented the first screw-cutting lathe in 1770. The household screwdriver appeared around 1780. Then, in the late 1790s, Englishmen Henry Mudsley and

close to 800,000 global standards, there were none just a century and a half ago. That was, until 1864, when a man named William Sellers initiated the first successful standardization fight in history, over—you guessed it—the screw. Sellers unveiled a new screw design that was easy to reproduce because of its thread, which was cut on 60-degree angle and had a flat apex.

The next major innovation in screws came in the 1930s, when Henry F. Phillips developed the Phillips screw. Its unique recessed cross slot was designed specifically for use with the automated screwdrivers used in auto assembly lines. What do-it-yourselfers may view as a design flaw—the Phillips' tendency to “cam out,” or slip, was actually a desired feature that prevented the automated screwdrivers from over torquing.

In recent years, the square drive screw, first patented in 1908—before the Phillips design—has regained popularity with the advent of power drivers with adjustable torque

settings. The square design is said to have better torque than the Phillips and does not pop out when used with torque setting, because the screwdriver disengages when a preset level of resistance is reached.

Today, although easily overlooked, screws are found in everything from microscopes and telescopes to computers and action figures. However, in some parts of the world, people still rely on hydraulic screw pumps for basic functions like transporting water.

Manufacturers continue to refine the screw to make it easier to use and more durable.



A woodcut of Archimedes' hydraulic screw pump from an edition of Vitruvius's *De Architectura* published by Fra Giocondo (c.1445-c.1525) in Venice in 1511

American David Wilkinson invented machinery for the mass production of threaded metal screws.

In fact, it was the screw lathe that allowed for the manufacture of all kinds of parts for everything vital to the industrial revolution, including the all important steam engine.

The screw also had another key role in industrial history. While today, according to the National Institute of Standards and Technology, there are