

Watt, James

Dates: 1736–1819.

Category: Biographies.

Summary: James Watt is best known for making improvements to Thomas Newcomen's steam engine with the addition of a separate condenser, paving the way for the Industrial Revolution.

Inventor, mechanic, engineer, and chemist James Watt was born on January 19, 1736, in Greenock, a small town outside Glasgow, Scotland. Often mistakenly credited for inventing the steam engine, Watt is best known for making improvements to the steam engine of Thomas Newcomen with the addition of a separate condenser. By increasing the steam engine's efficiency, Watt paved the way for the advances of the Industrial Revolution.

Watt was born into a fairly prosperous family. His father, also named James Watt, was a shipwright and merchant. Homeschooled during his early youth by his mother, Agnes Muirhead, Watt excelled in his studies but was often plagued by health problems and a weak constitution. Upon

completing grammar school, Watt was allowed to have a work space in his father's shop. Although the makings of a gifted craftsman were evident, Watt had not yet taken on an official apprenticeship. Shortly after his mother's death in 1753, Watt decided to become a mathematical instrument maker, perhaps influenced by the occupation of his grandfather, Thomas Watt, who was a mathematics instructor. Temporarily living with his relatives in Glasgow, Watt was later able to secure an unofficial apprenticeship with the London-based instrument maker John Morgan. Shortly after the completion of an exhaustive year of study, Watt sought to open a shop of his own upon his return to Glasgow in 1754. However, because Watt had not completed a formal apprenticeship, the local craft guild hindered Watt from practicing his trade in the town. Taking refuge at the University of Glasgow, Watt was able to practice his trade beyond the reach of the local guild, as the university was in need of a skilled craftsman who could repair various scientific instruments. There, Watt took full advantage of the opportunities offered by the academic setting and first encountered a model of a Newcomen steam engine.

By 1758, Watt had his own shop at the university and had befriended the chemist Joseph Black. It was through his conversations with Black that Watt learned a great deal about chemistry and heat. In 1763, Watt discovered that the university had access to a nonfunctional model of a Newcomen steam engine that was in London being repaired. Upon learning about Watt's interest in the engine, John Anderson, a professor of natural history, had the engine returned and given to Watt. Watt was able to repair the device but discovered that it was inefficient. In 1764, Watt married his cousin, Margaret Miller.

Upon realizing that a significant portion of heat from the steam was being lost, Watt ingeniously thought of condensing the steam in a separate compartment rather than in the main chamber, as the Newcomen engine was designed to do. Watt had a working model by 1765 and agreed to partner with John Roebuck to produce the commercial versions of the engine, but the patent was not granted until 1769. Prior to Watt's addition, the Newcomen

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A lithograph of Scottish inventor, mechanic, engineer, and chemist James Watt at work on an experiment. It is believed that Watt paved the way for the advances of the Industrial Revolution by improving upon Thomas Newcomen's steam engine design by adding a separate condenser, which increased the engine's efficiency.

engine was used only in a limited range of mining operations. With its increased efficiency, however, the new engine had applicability in a variety of industries. The prototype for a mining operation, at Kinneil, was constructed in 1769.

By 1773, Watt's business partner, Roebuck, was encountering financial troubles. With two children to support and the death of his wife in the same year, Watt set aside the development of his new engine, instead taking up civil engineering and surveying work. A year later, Watt entered into a new partnership with Matthew Boulton. In 1775, Boulton used his political and business connections to extend the 1769 patent to the year 1800 by an act of Parliament. The new Boulton and Watt engines were soon used throughout the mining operations of Cornwall, replacing the older and less efficient Newcomen engines. Boulton and

Watt both achieved a measure of financial success well into their later lives.

During the 1780s, Watt engaged in a number of additional creative activities beyond improving the steam engine, although none was as commercially successful. In 1780, Watt patented a means of copying documents via the use of a press and thin paper. In 1784, Watt submitted a patent for the development of a steam locomotive. In 1786, he dabbled with chemical bleaching. Watt finally retired from the steam engine business in 1800, turning over control of the company to his and Boulton's sons. He died on August 25, 1819, at his home in Handsworth, Birmingham.

The International System of Units contains a measure of power, the watt, that bears his name. Streets have been named after him, statues in his likeness have been erected, and monuments in his

honor are scattered throughout the world. The British Institution of Mechanical Engineering also awards the James Watt International Gold Medal to outstanding mechanical engineers. Arguably the single most influential inventor of the Industrial Revolution, James Watt left a legacy that is still felt today.

RICHARD D. BESEL

Further Reading

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See Also: Black, Joseph; History of Energy: 1700–1800; Industrial Revolution; Savery, Thomas; Smeaton, John; Stephenson, George; Stirling, Robert; Trevithick, Richard.