

Eli Whitney

Inventor and Manufacturer



Noted for inventing the cotton gin, Eli Whitney has an even more important claim to fame. He developed the idea of mass producing identical parts, paving the way for the growth of factories.

Eli Whitney (1765–1825) was born to a middle-class family in Massachusetts. He was the eldest of four children. Whitney's sickly mother stayed in bed for most of his early childhood. Her death the year he turned eight left Whitney responsible to help care for his younger sister and brothers. His sister later wrote, "He was remarkable for thinking and acting for himself at the age of ten or twelve years."

Youthful Talents Though Whitney was slow in reading, the young boy proved more able at math. But his greatest skill was making things with his hands in his father's well-equipped workshop. At the age of 12, Whitney built a violin. It was "in every part like a common fiddle and made tolerable good musick."

Whitney's father remarried when the boy was 14. When his stepmother broke the blade of a favorite knife, Whitney made a perfect replacement. She and the rest of his family began to believe him when he said he could "make just such ones if I had tools and I could make tools if I had tools to make them with."

To earn enough money to attend Yale College, Whitney served as a schoolmaster in a nearby town. He had to work hard to stay ahead of his own students. At Yale, Whitney studied science and math. He also learned some law. He used the law to defend his rights to his inventions.

The Cotton Gin After graduating from college, Whitney had intended to be a teacher. He arrived in Georgia to take a tutoring job. Then he discovered that the pay would be far too little to support him. While he decided what to do next, Whitney stayed as guest at a plantation. It was owned by Catherine

Greene, the widow of a Revolutionary War general.

Greene noticed that her young guest was skilled at working with his hands. Indeed, all her friends had admired the new needlework frame he built for her. In November 1792, Greene challenged Whitney to invent a machine to clean cotton of its seed. By spring the following year, Whitney had such a machine. He hoped to make a fortune by patenting his cotton gin. It made the cleaning task easier. The young inventor proudly described the gin to his father.

A VOICE FROM THE PAST

This machine may be turned by water or with a horse, with the greatest ease, and one man and a horse will do more than fifty men with the old machines. It makes the labour fifty times less, without throwing any class of People out of business.

ELI WHITNEY, quoted in *Eli Whitney and the Birth of American Technology*

Eli Whitney's cotton gin had a huge effect on the new country. It made cotton the leading crop in the South. Slaves were needed to produce and clean the cotton. The cotton gin also boosted cotton manufacturing and the growth of mill towns in New England. Cotton became cheap and popular, as yearly production ballooned from just 2 million pounds to about 60 million pounds by 1805.

The cotton gin's inventor made little money from his invention. Instead, Southern planters who wanted to switch to cotton farming simply copied it. Whitney later said that "an invention can be so valuable as to be worthless to the inventor." Whitney never patented another invention. However, he eventually achieved financial success.

Successful Musket Maker Whitney's success came as the result of America's troubles with France. In 1797, a desperate United States government asked private gun-makers to provide 40,000 muskets. The government needed these guns quickly. In the past three years, both national armories had produced only 1,000 muskets.

The government armories employed traditional gun-makers. They made individual muskets part by part. If a part of one of these weapons broke, the whole musket had to be replaced. Whitney had a different idea. He promised to supply 10,000 muskets in just two years.

How did Whitney plan to make guns so quickly? He made special machine tools. With these tools, each worker used a model to make just one part over and over again. All the individual parts put together would make one musket. Most important, any one part would fit any other musket of the same design. Whitney's major contribution to manufacturing was this idea of interchangeable parts.

Whitney completed his contract to build the muskets using unskilled labor. In contrast, several other manufacturers failed, even though they had used skilled workers. Whitney had good reason to be proud of what he called his New Methods.

A VOICE FROM THE PAST

Having actually made about 15,000 muskets, at least equal in quality to any that have been manufactured in this country (which is more than has been accomplished by any other individual in the United States) he feels himself warranted . . . in believing that the New Methods which he has invented of working metals and forming the several parts of a musket, are practically useful and highly important to his country.

ELI WHITNEY, quoted in *American National Biography*

Whitney's methods brought him the wealth he had sought. They also inspired other inventors to produce affordable consumer goods such as clocks and sewing machines.

Final Years When he was 52, Whitney married Henrietta Frances Edwards. The couple had four children. Whitney's young son would later inherit his father's musket factory.

In poor health, Whitney hoped to live long enough to perfect a machine for handling iron and steel. His last design was a sketch for a tumbler mill. The far-sighted inventor saw that letting small metal parts knock against each other would smooth metal's rough edges. Whitney did not survive to complete this machine. However, his earlier inventions began a new age of mass production.

Review Questions

1. How was Eli Whitney affected by his mother's early death?
2. What talent and interest persisted throughout Whitney's life?
3. How did Whitney influence later inventors?

Critical Thinking

4. **Making Inferences** What did Whitney mean when he said that an invention could be "so valuable as to be worthless to the inventor"?
5. **Recognizing Effects** What were some unintended social effects of the cotton gin?
6. **Contrasting** Why was Whitney's method of manufacturing muskets superior to the earlier method?