

LEQ: What industry was first affected by the Industrial Revolution?



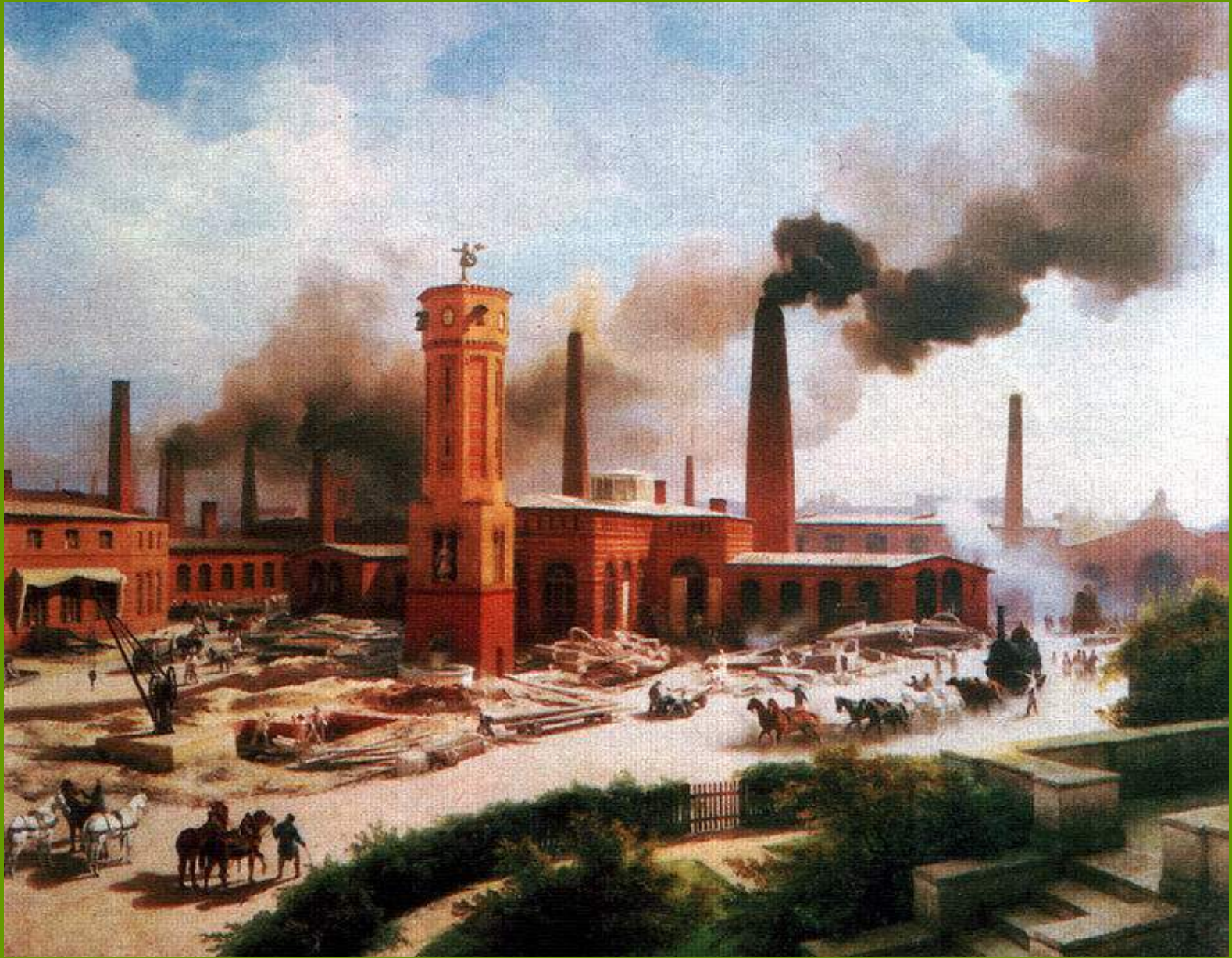
Power loom weaving is shown in this illustration titled, "The Interior of a Cotton Mill." This painting by Thomas Allom (1804-1872) is courtesy of firststart.com.

LEQ: What industry was first affected by the Industrial Revolution?
The Textile Industry



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America's Industrial Revolution Begins



This is not America. This is Berlin, Germany's Borsig Factory where steam engines were manufactured. This image, painted by Karl Eduard Biermann (1803-1892) in 1847 is courtesy of Wikimedia Commons.

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At the time of the American Revolution, agriculture dominated the American economy.



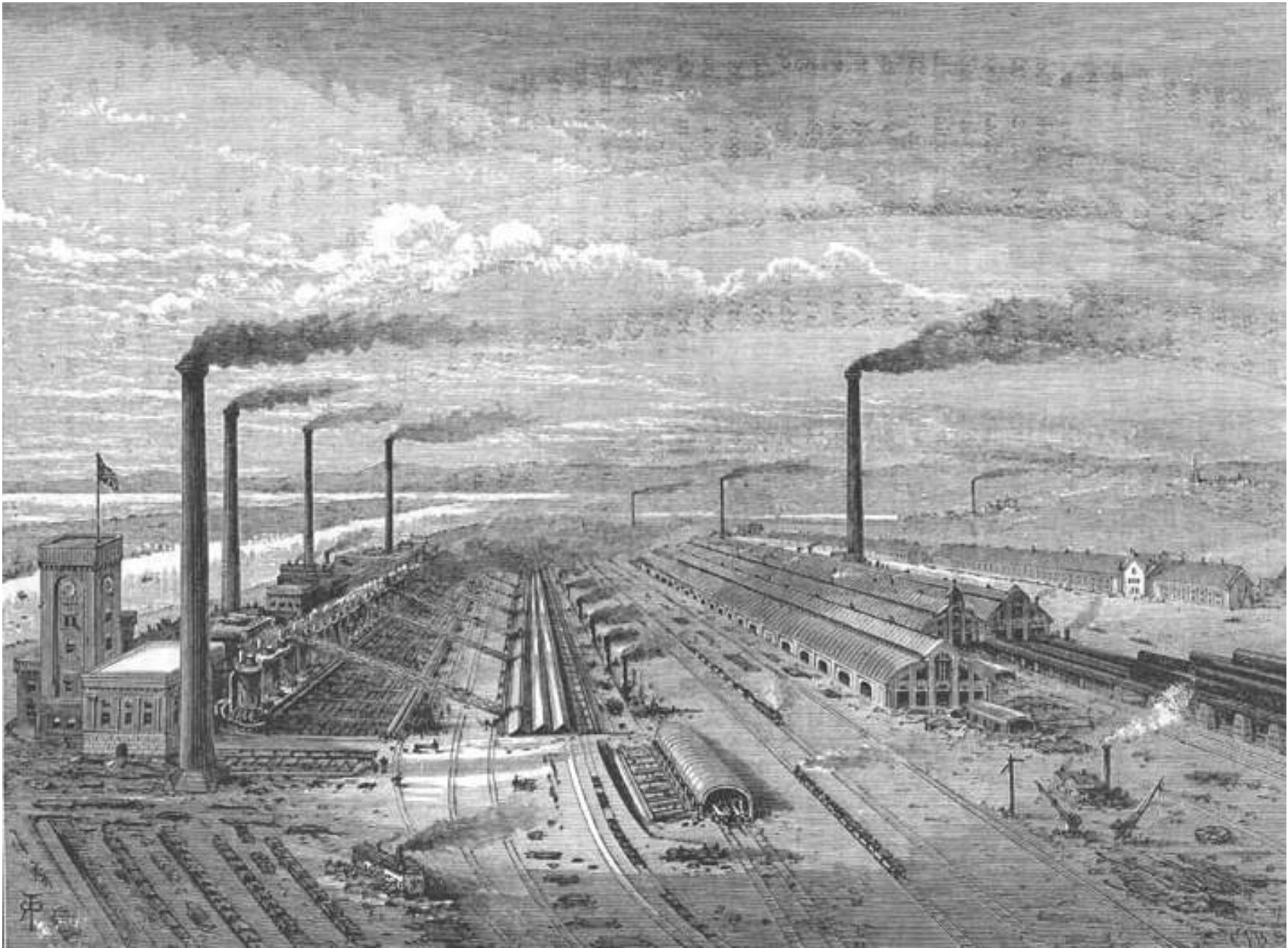
This image shows a colonial farmer using oxen to plant his grain seeds, which are probably wheat or corn. This painting by Vance Locke in 1952 is courtesy of threevillagehistoricalsociety.org.

The invention of new machines upset Thomas Jefferson's vision of the United States as a simple agricultural society.



This is Thomas Jefferson's kitchen garden at Monticello. This image by Billy Hathorn was taken in 2011. It is courtesy of Wikimedia Commons.

The rise of factories that used machines to produce goods caused great changes in the country, which affected where and how people lived, how they earned their living, and what kind of goods that they could purchase.



This image shows the Barrow-in-Furness Steelworks in approximately 1877. It is courtesy of Wikimedia Commons.

The growth of industry eventually produced changes so great that this time in history is called the Industrial Revolution.



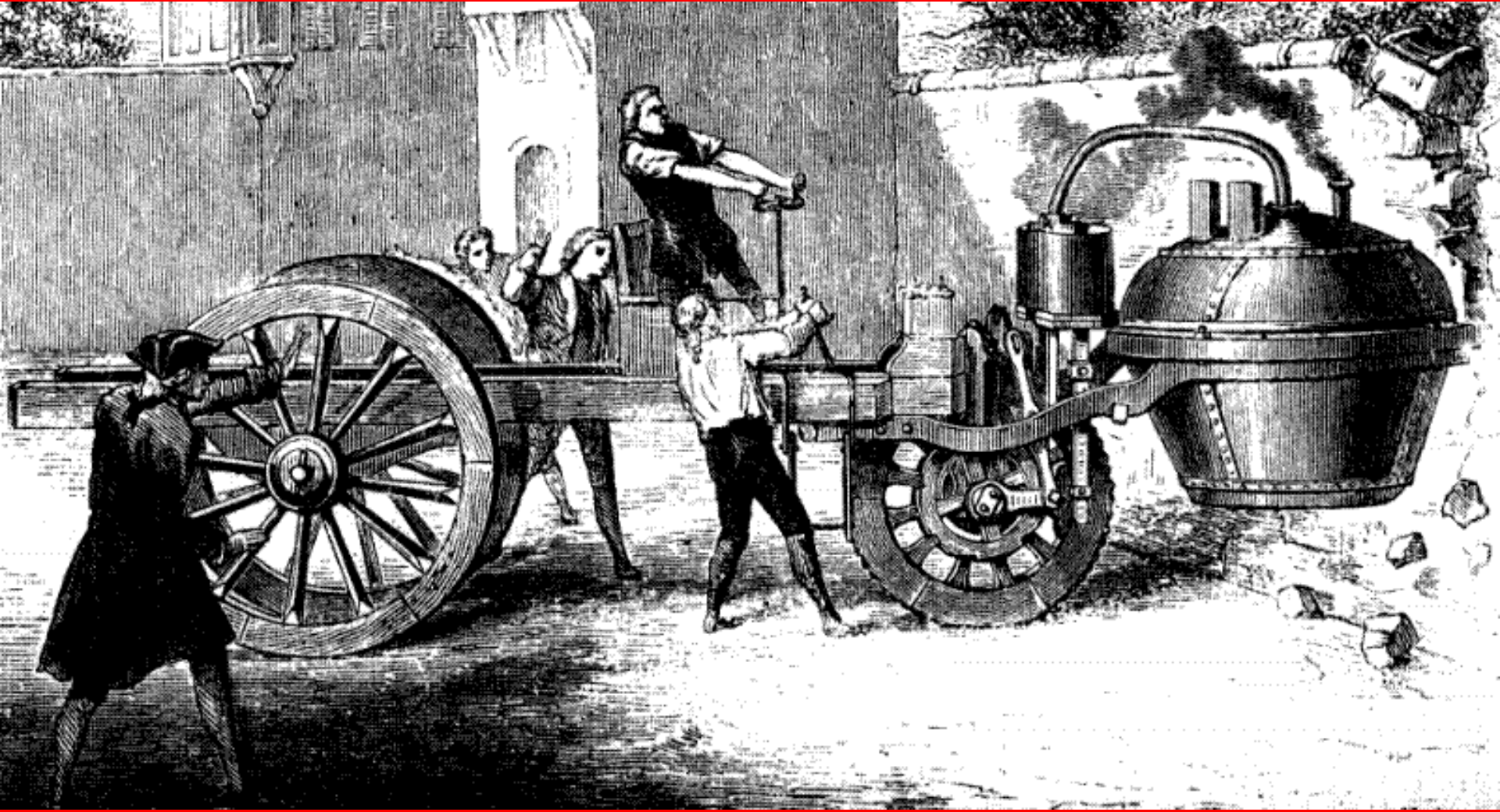
The painting *Iron and Coal* shows workers at a factory circa 1855-1860. This painting by William Bell Scott (1786-1821) is courtesy of Wikimedia Commons.

The Industrial Revolution began in Britain.



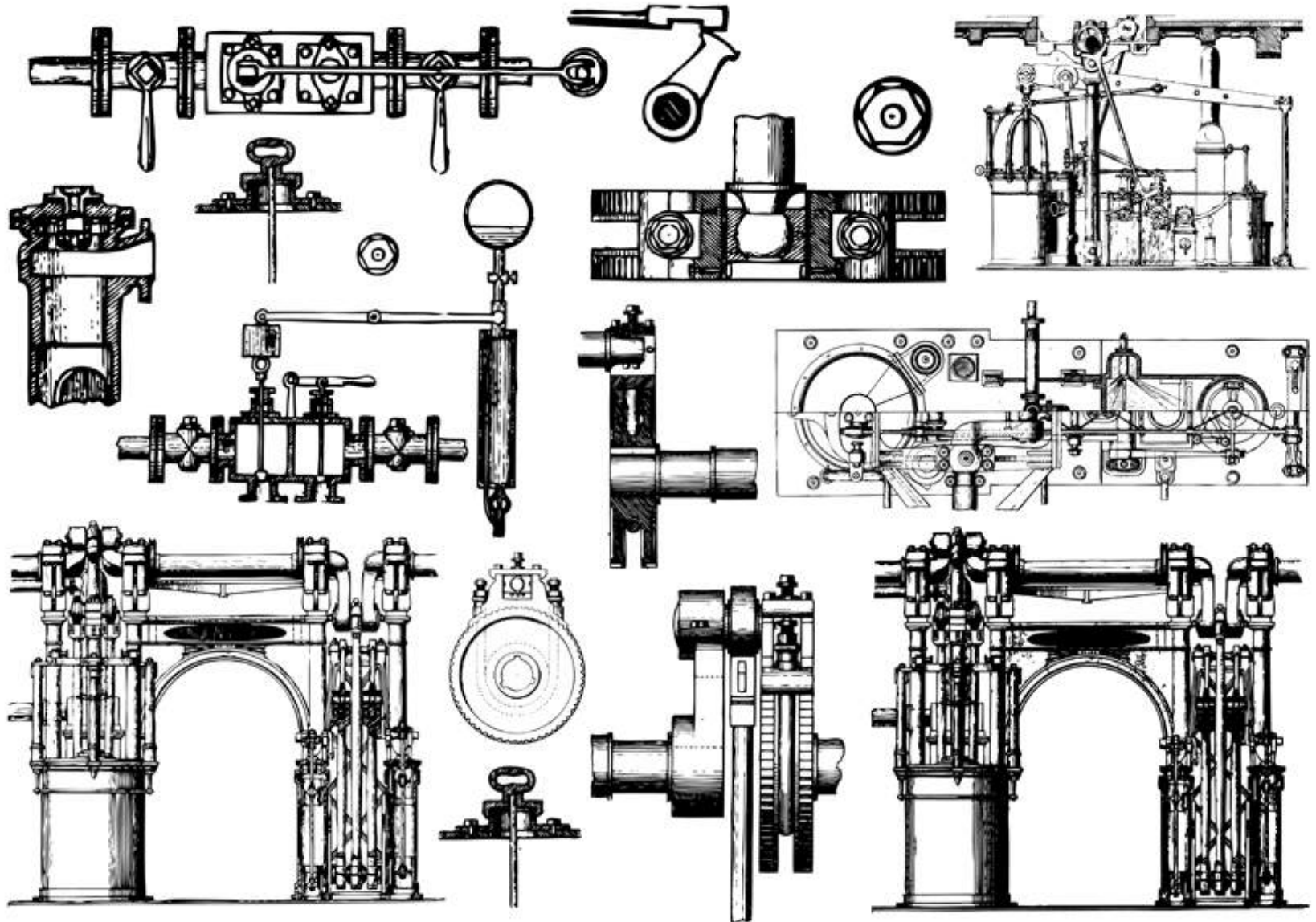
The Industrial Revolution began in Great Britain in the middle of the 1700s. This image is courtesy of industrialchristmascarol.blogspot.com.

British inventors developed new machinery and new sources of power-- water, steam, and coal.



In 1769 a French artillery officer, Nicholas Joseph Cugnot, built and ran a three wheeled carriage powered by a steam engine. It achieved a top speed of three miles per hour, and wasn't thought to be an improvement over the horse. On its first trip it ran off the road when it couldn't negotiate a curve. This image is courtesy of Wikimedia Commons.

Power-driven tools slowly replaced hand tools.



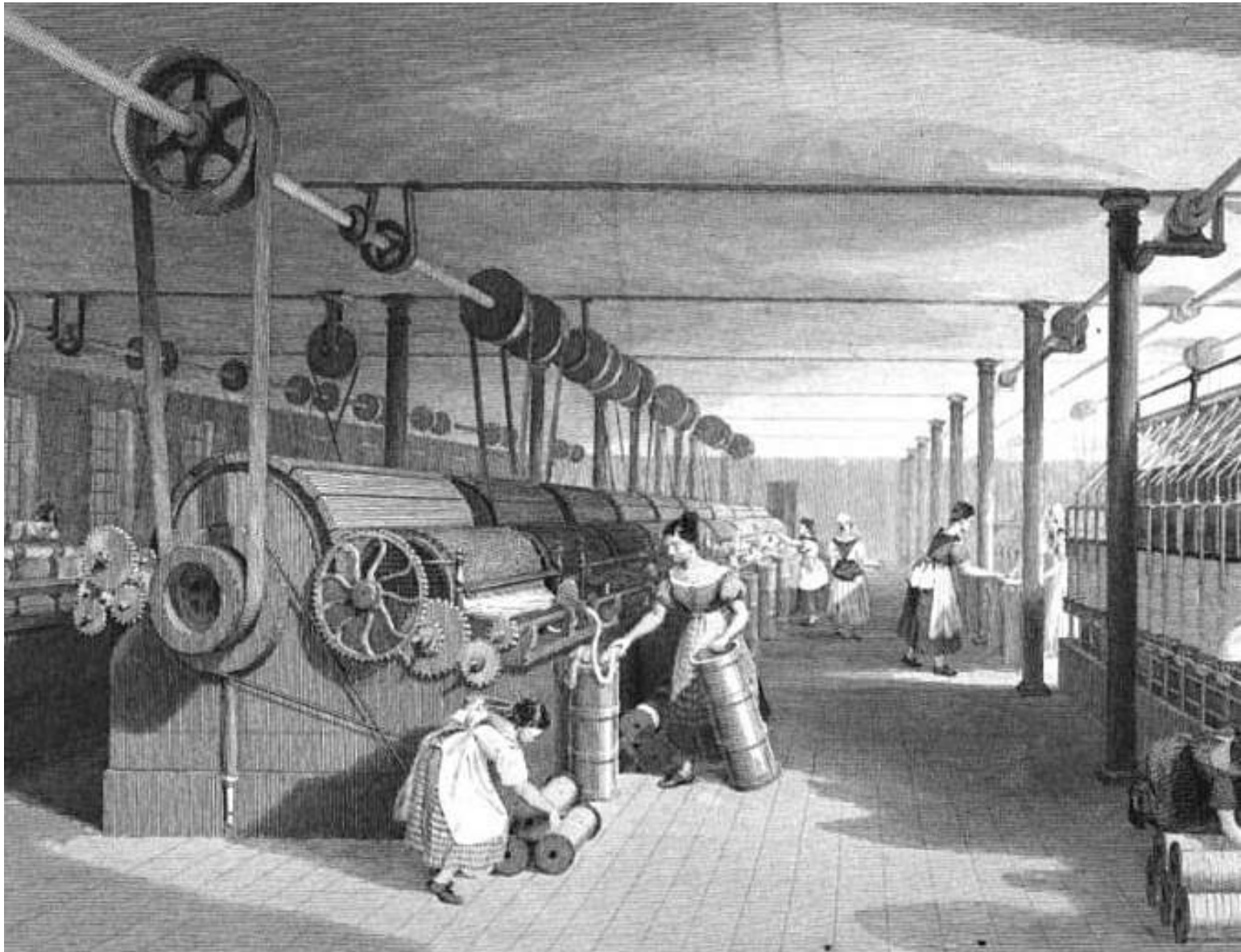
This image shows a collection of new machines, and parts of machines that were used near the beginning of the Industrial Revolution. This image is courtesy of vectors1.com.

The Industrial Revolution affected the textile, or cloth industry first.



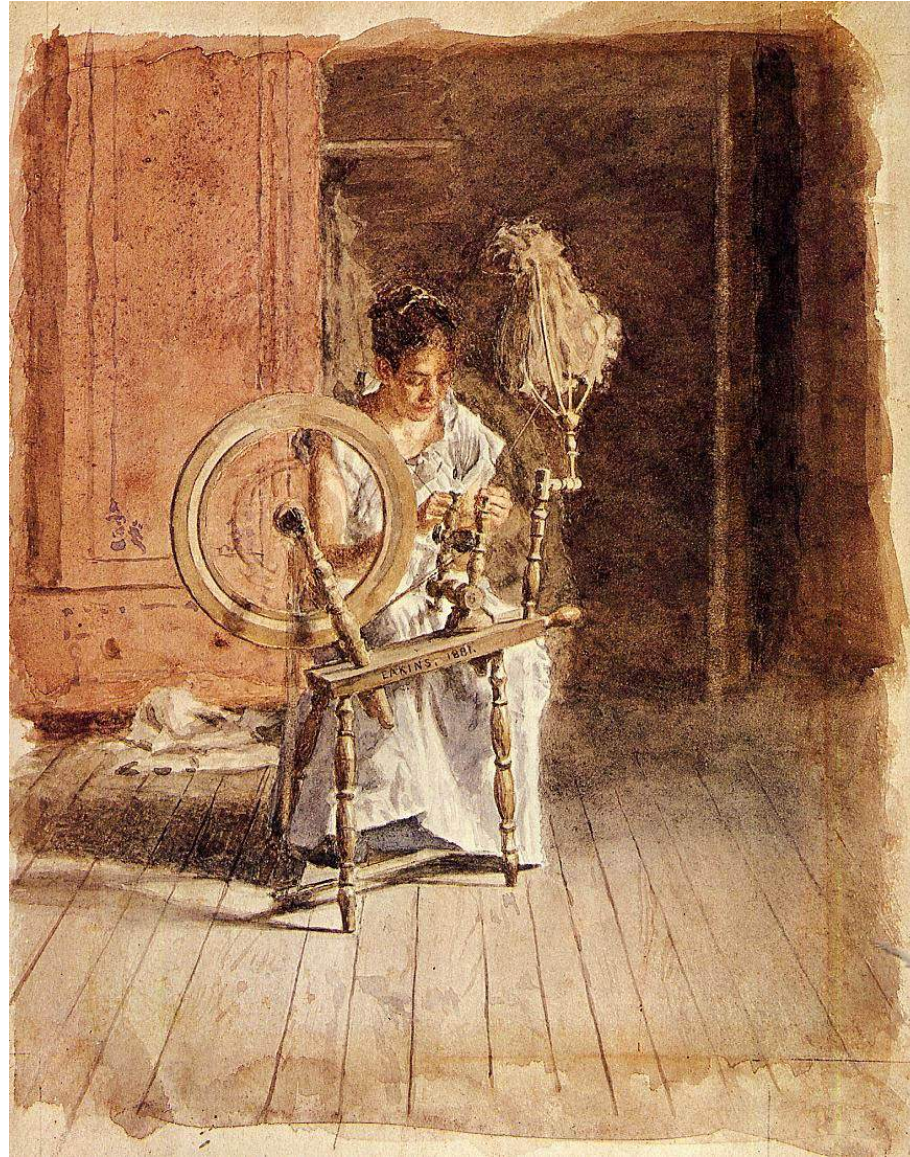
This image shows power looms in operation in a cotton mill in the 1830s. This image by Thomas Allom (1804-1872) was included in Edward Baines' *History of the Cotton Manufacture in Great Britain*, published in 1835. This image is courtesy of trentonhistory.org.

New machines made thread or yarn and wove it into cloth.



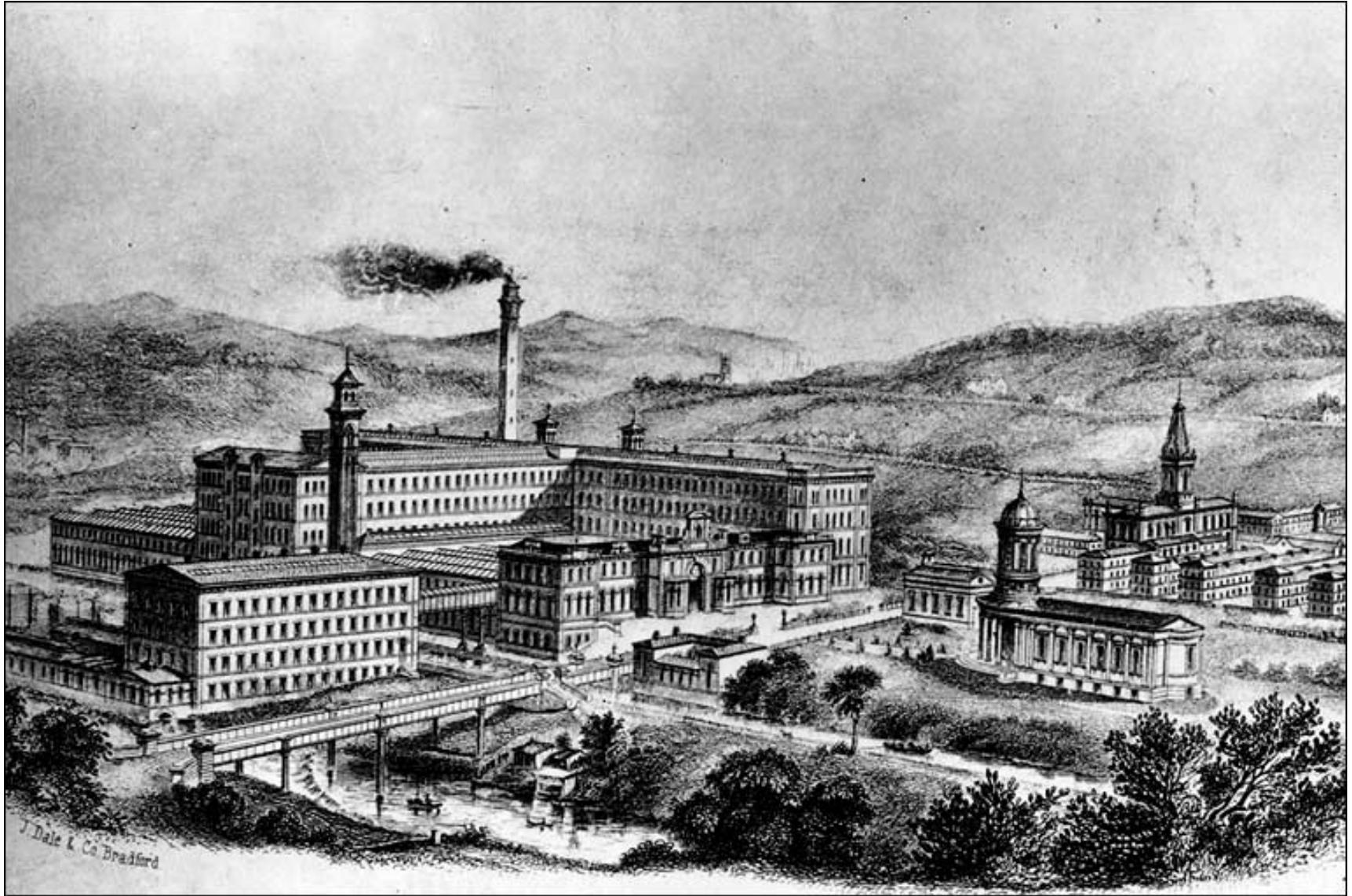
This image is titled "View of Carding, Dawing, and Roving" in the Swainson, Birley, and & Company Cotton Mill near Preston, Lancashire, England. This image by Thomas Allom (1804-1872) was included in Edward Baines' *History of the Cotton Manufacture in Great Britain*, published in 1835.

Before the Industrial Revolution, families and artisans had completed these processes at home or in small shops.



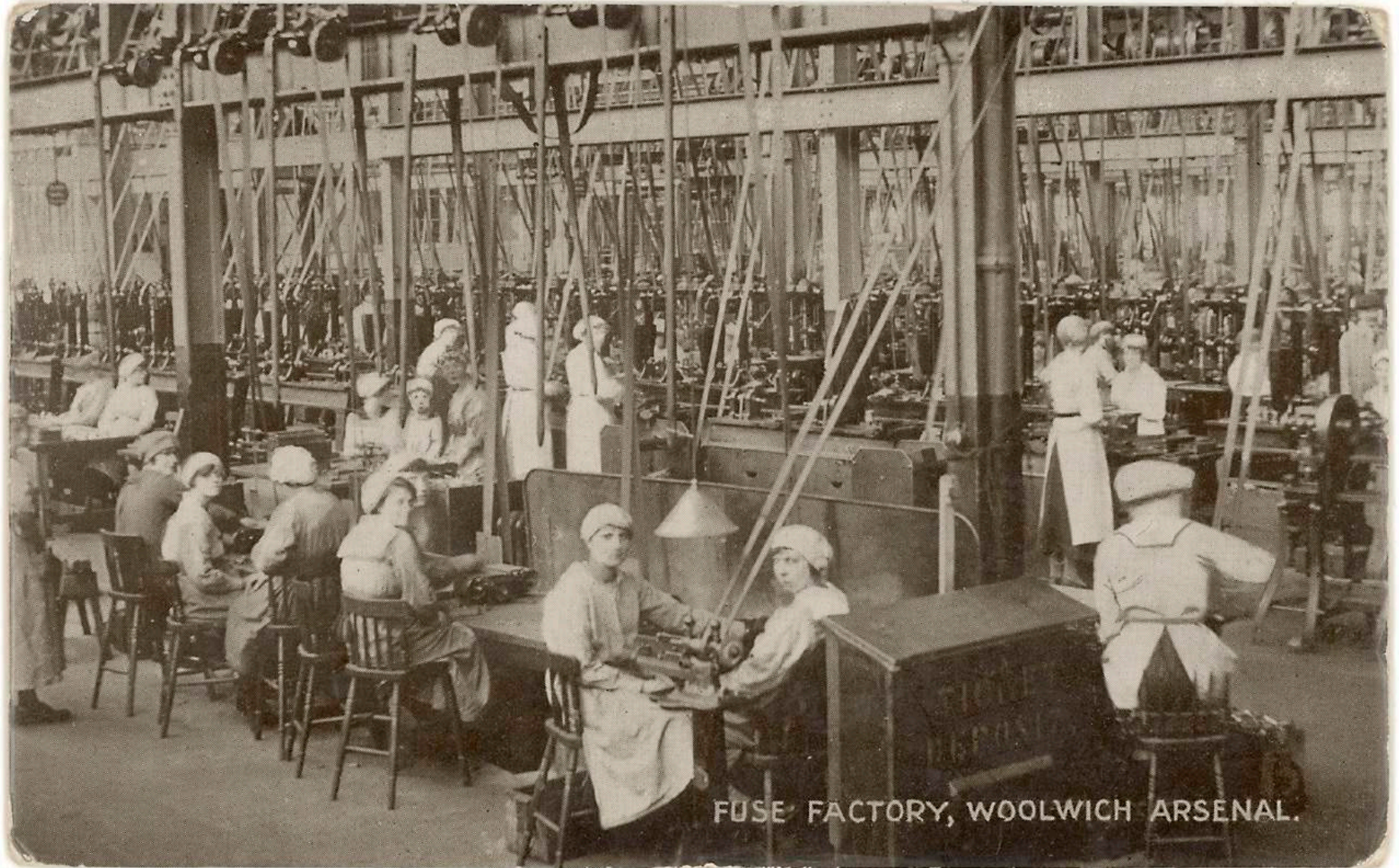
This painting shows a woman spinning at her spinning wheel circa 1882. This painting by Thomas Eakins(1844-1916) is courtesy of Wikimedia Commons.

Now owners built factories to house these new, large machines and hired large groups of workers.



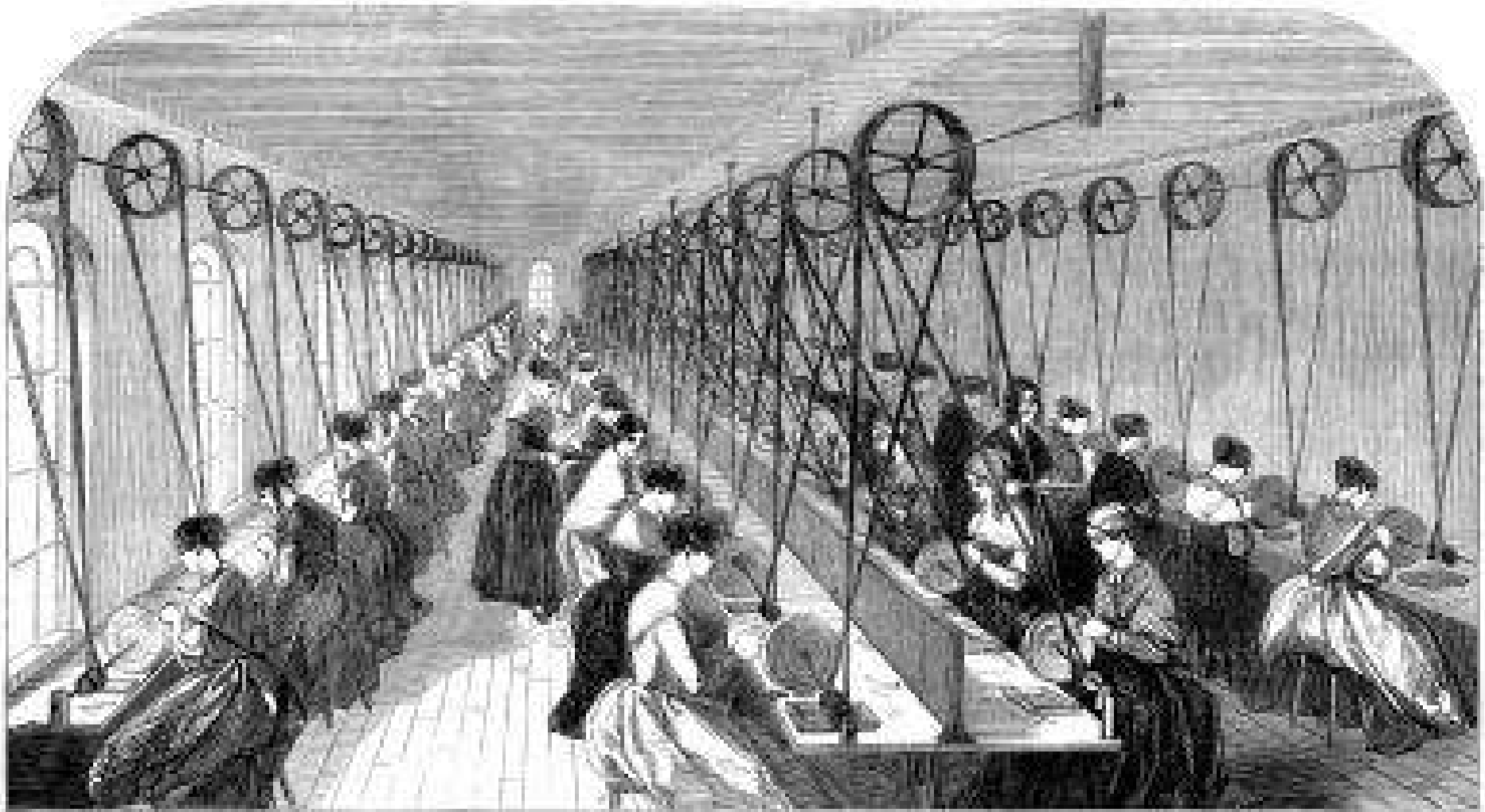
This is the Salts Woollen Mill in Saltaire, Yorkshire, England, which opened in 1853. This image is courtesy of [news.bbc.co.uk](https://www.bbc.com/news).

Factory owners began to organize factory work so that it was completed as rapidly and efficiently as possible.



This photograph shows factory workers at the Fuse Factory, Woolwich Arsenal, circa the 1890s. This image is courtesy of Wikimedia Commons.

The factory system-- using machinery and workers together—made it possible for workers to produce large quantities of goods.



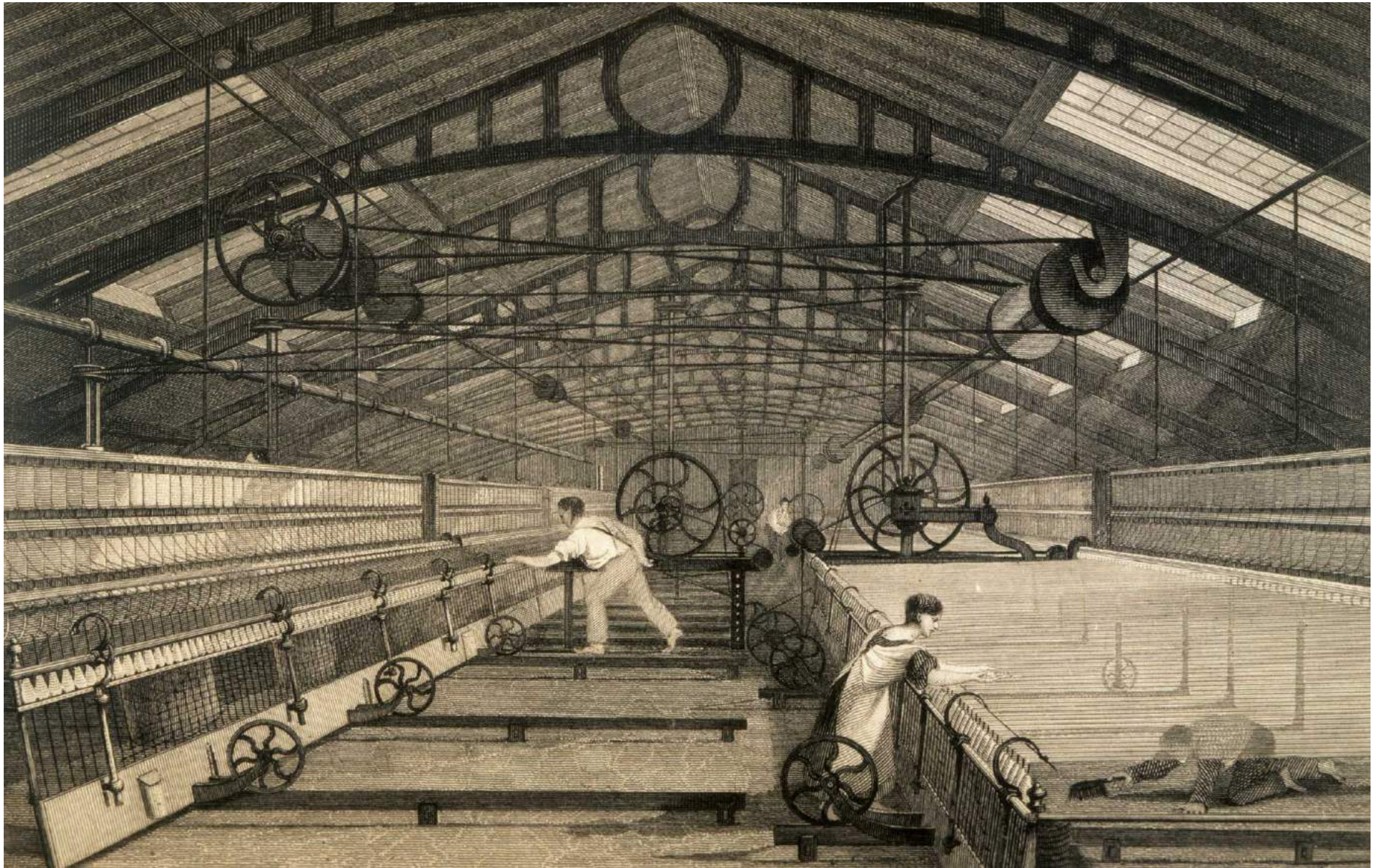
Women were often employed in factories during the Industrial Revolution. This image is courtesy of ehow.com.

The British marketed their goods throughout the world.



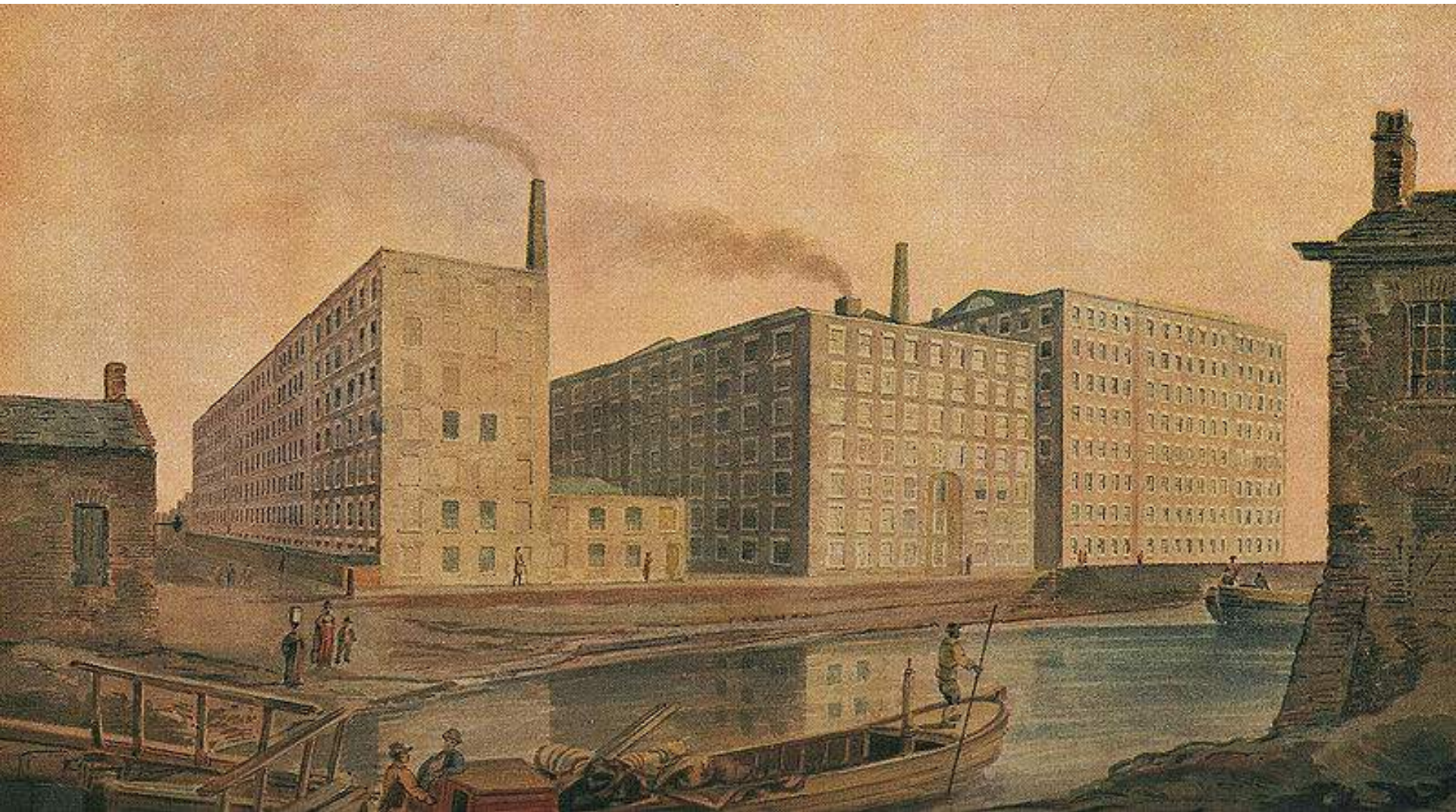
Calico was a brightly colored cloth. This English robe was created circa 1785-1791. It is over a petticoat which was made of muslin. This image is courtesy of thedreamstress.com.

Low prices helped investors in the factories make huge profits.



This image is titled "View of Mule Spinning" in the Swainson, Birley, and & Company Cotton Mill near Preston, Lancashire, England. This image by Thomas Allom (1804-1872) was included in Edward Baines' *History of the Cotton Manufacture in Great Britain*, published in 1835.

Knowing that they had figured out the secret of manufacturing, the British carefully guarded their inventions.



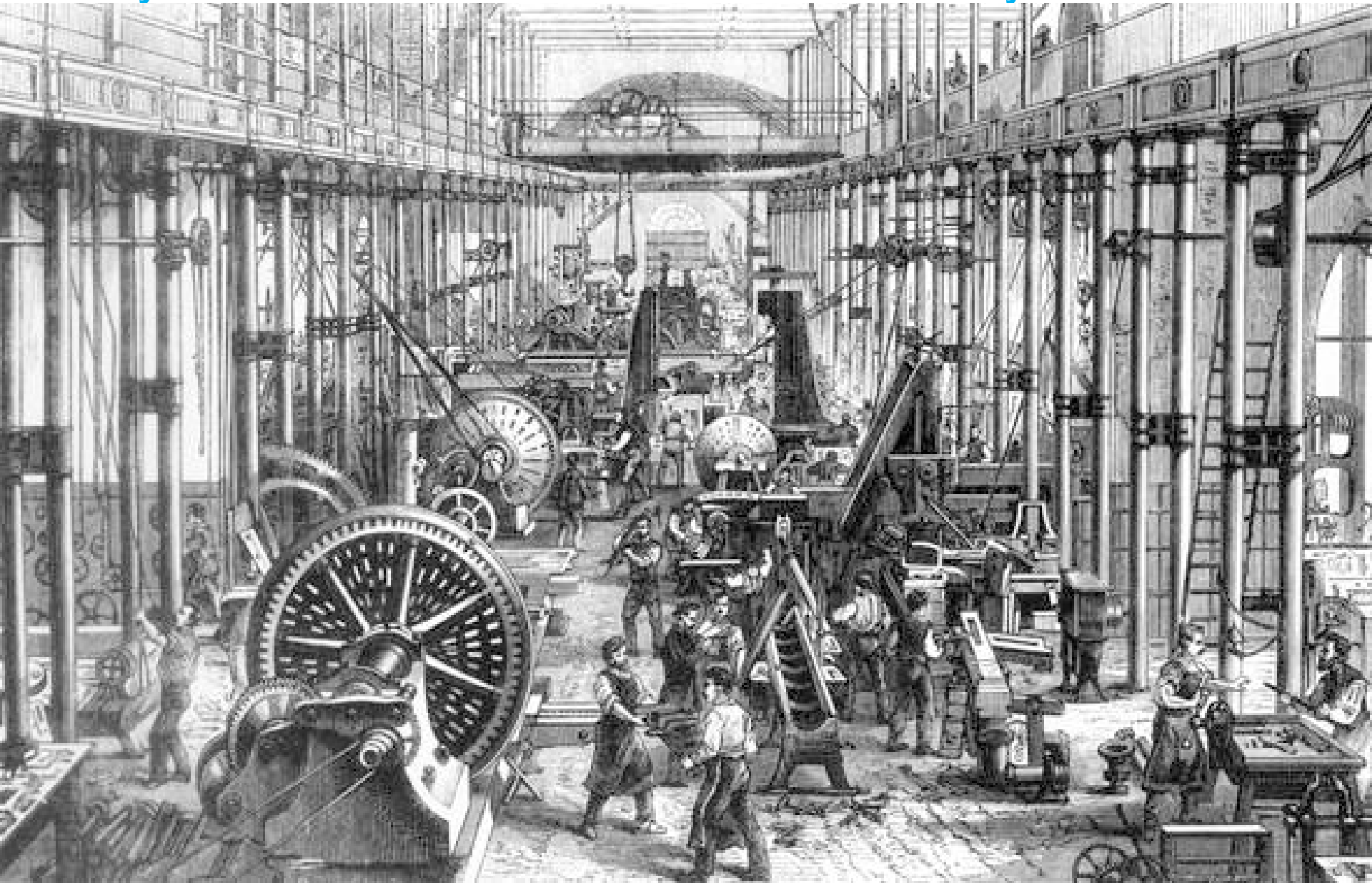
This image shows the Ancoats, Manchester, McConnell & Company's Mills in Manchester, England. These factories were constructed circa 1820. This image is from the publication *A Century of Fine Cotton Spinning, 1790-1913*. This image is courtesy of Wikimedia Commons.

The British Parliament passed laws making it illegal for any machines, plans for machines, or skilled workers to leave Britain.



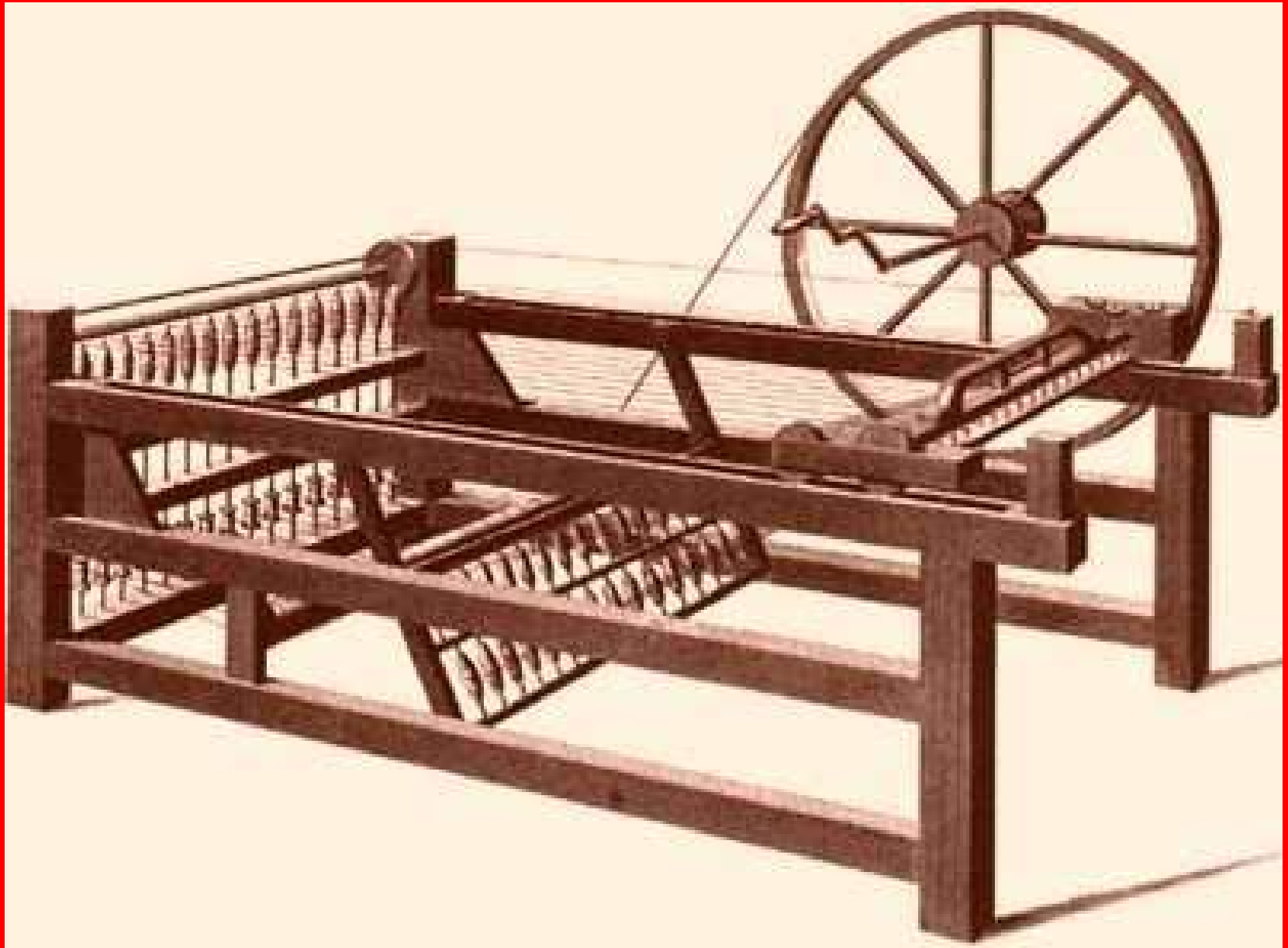
This painting shows Prime Minister William Pitt addressing the British Parliament in 1793 concerning war with Austria. This painting by Karl Anton Hickel (1745-1798) is courtesy of the National Portrait Gallery in London.

Many of these inventions were Revolutionary for their time.



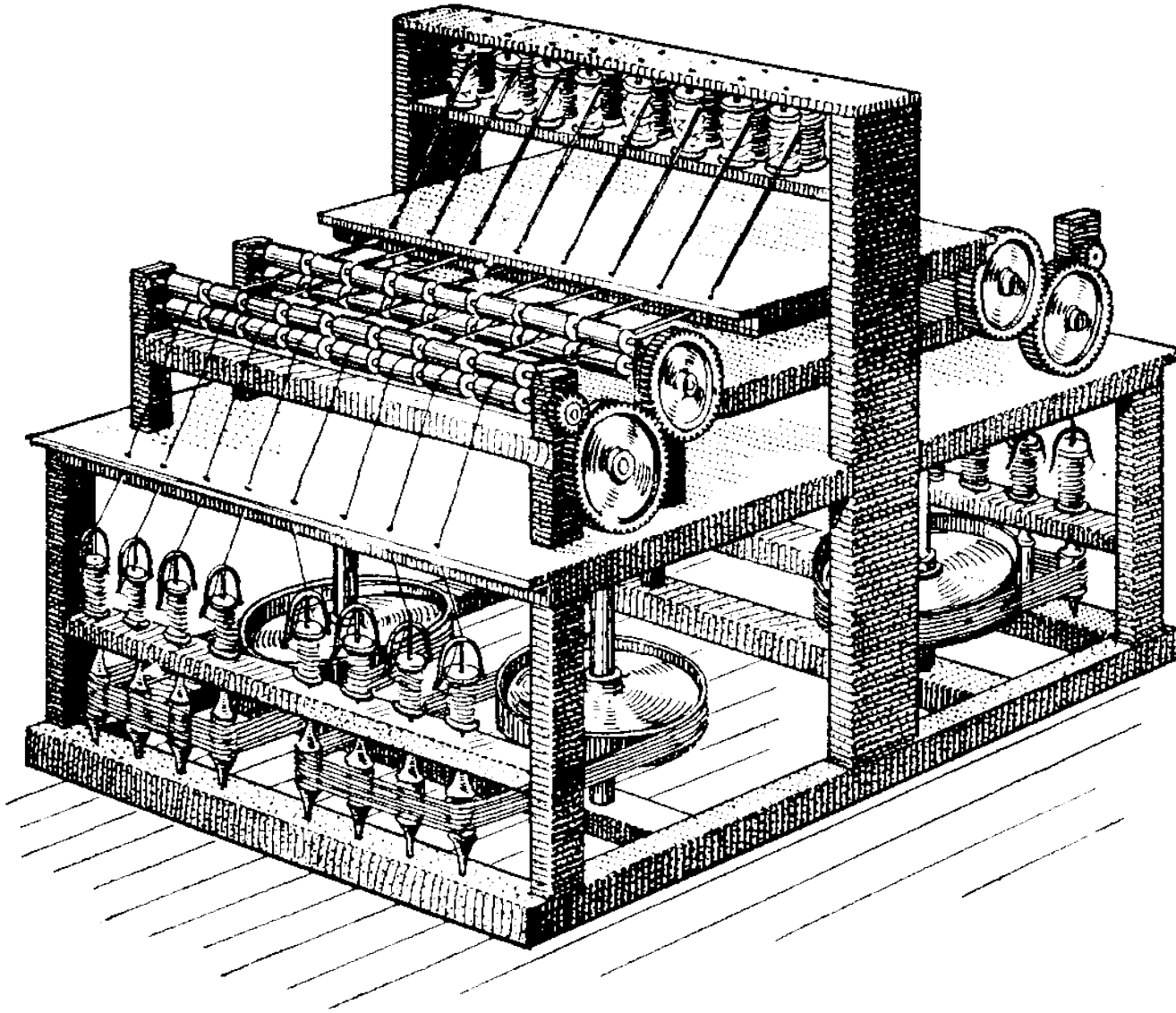
Both British and American inventors contributed to the Industrial Revolution. This drawing of a British factory in the early 1800s shows workers performing many different tasks. This image is courtesy of bookstellyouwhy.com.

In 1764 an Englishman, James Hargreaves, invented the spinning jenny.



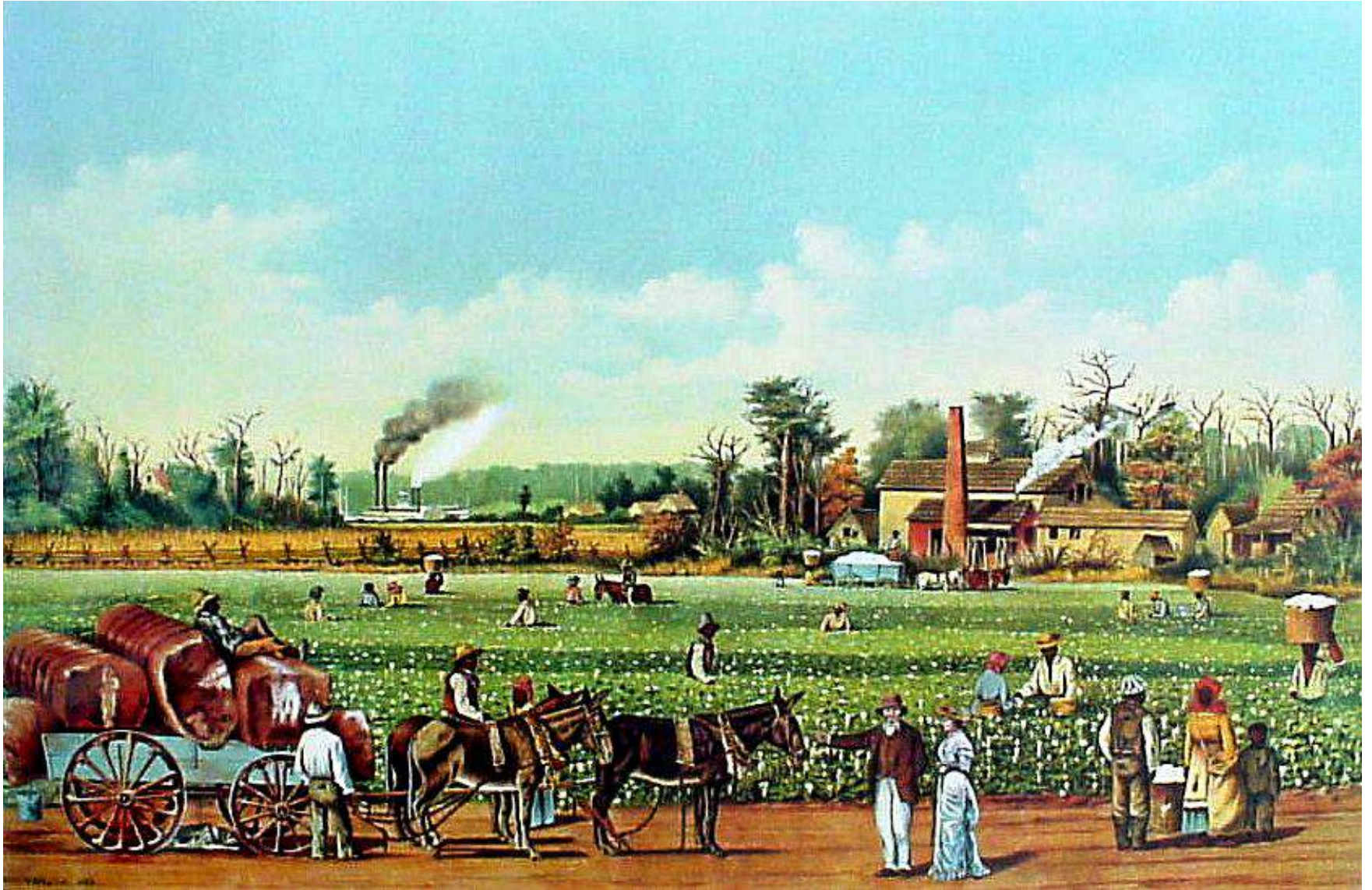
This machine spun many threads at one time, unlike the handheld spinning wheel that could only spin one thread or ball of yarn. This image is courtesy of inventors.about.com.

In 1769 another Englishman, Richard Arkwright invented the water frame, a water-powered device that held many more spindles and produced thread faster than the spinning jenny.



Arkwright's water frame used a succession of uneven rollers rotating at increasingly higher speeds to draw out the soft strand of fiber that has been twisted, and freed of foreign matter before it is converted into yarn. This image is courtesy of heritage-history.com.

Most of the cotton that Great Britain used in its textile factories was grown in the United States.



This painting is titled "A Cotton Plantation on the Mississippi." This painting by William Aiken Walker (1838-1921) was created circa 1884 for Courier and Ives. This image is courtesy of booksellersvsbestsellers.com.

In 1793 an American inventor, Eli Whitney, invented the Cotton Gin, a machine that removed the seeds from cotton.



The Cotton Gin removed the cotton seeds from the cotton fibers. A worker using the cotton gin could clean as much cotton as 50 people could by hand. This image is courtesy history.com.

The first factories depended on the energy generated by running water and had to be built near rivers.

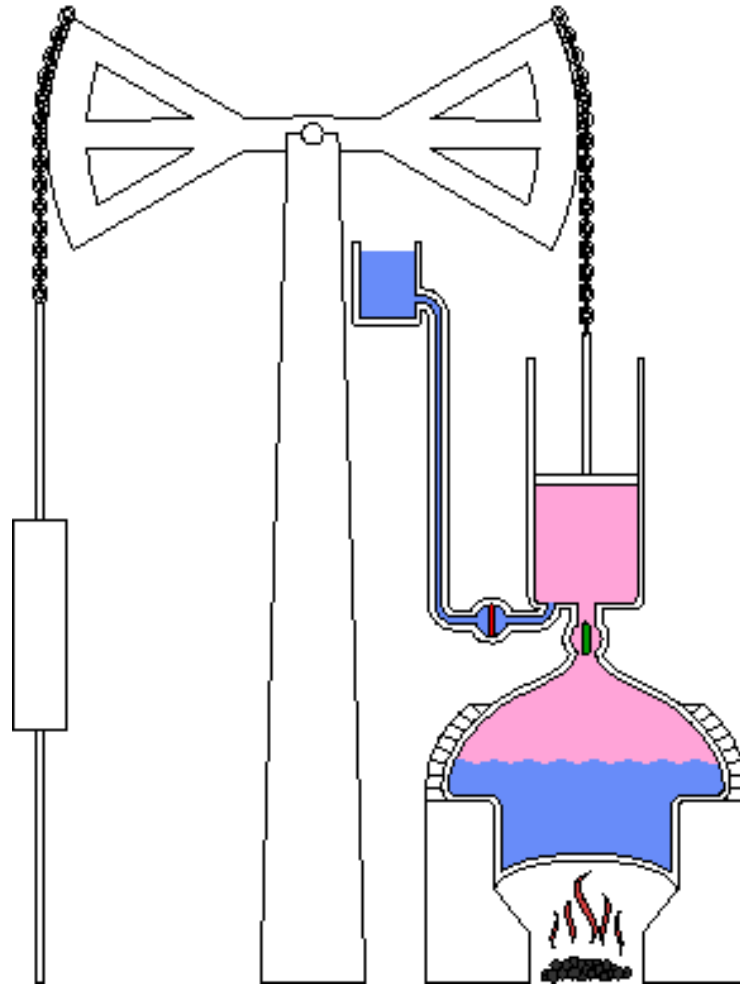


Richard Arkwright built the world's first successful water-powered cotton mill in Cromford, England in 1771. This image is courtesy of blog.francishemingway.com.

In 1796 British manufacturers began to use a new source of energy– steam.

To see this image move, [click here](http://mrhousch.com/ppts/Newcomen_atmospheric_engine_animation.gif):

http://mrhousch.com/ppts/Newcomen_atmospheric_engine_animation.gif



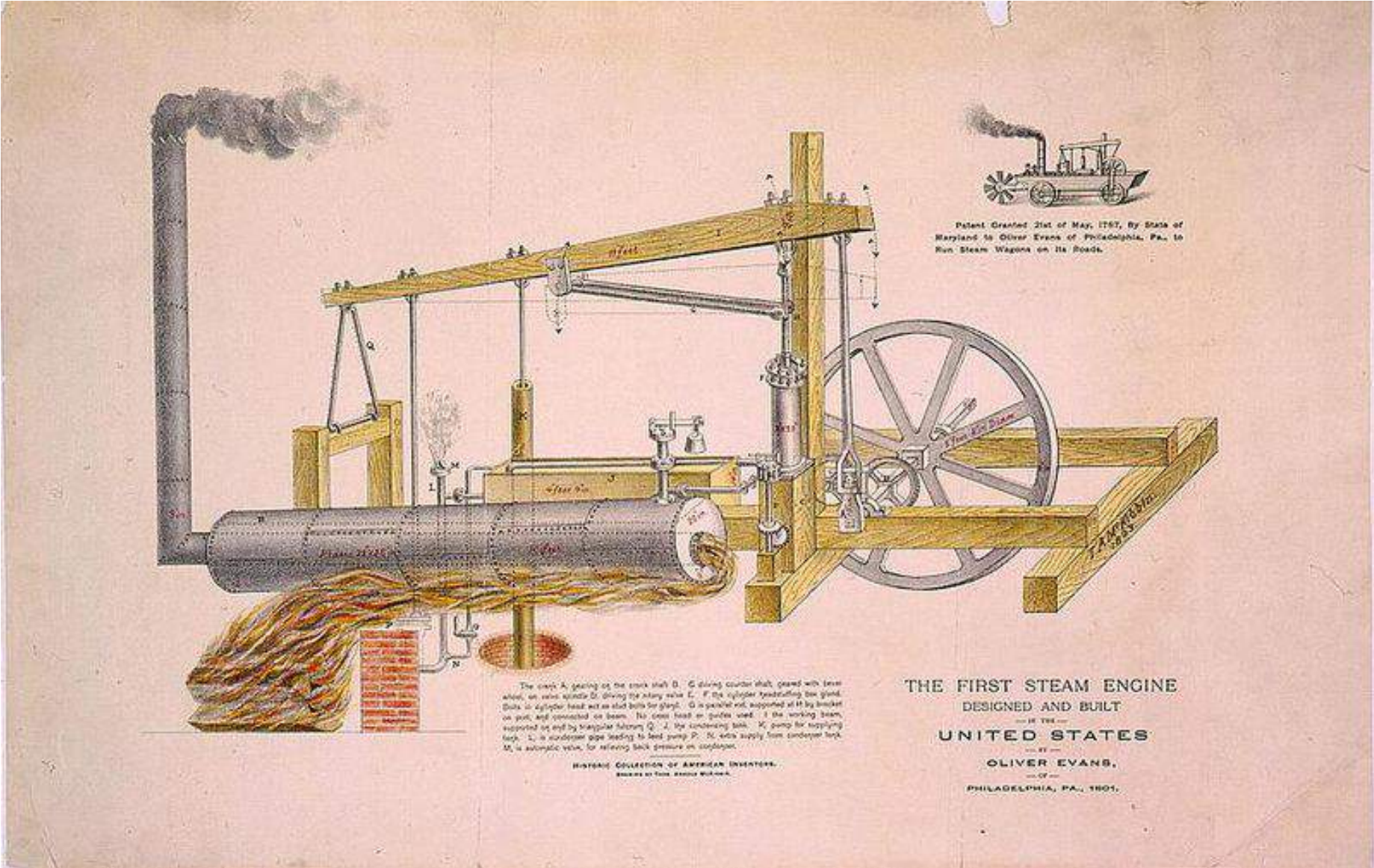
This is a diagram of the Newcomen steam engine in order give one an idea of how the steam moved the parts of a machine. Steam is shown as pink and water is blue. Valves move from open (green) to closed (red). This image is courtesy of Wikimedia Commons.

James Watt of Scotland improved the design of steam engines and made their use practical.



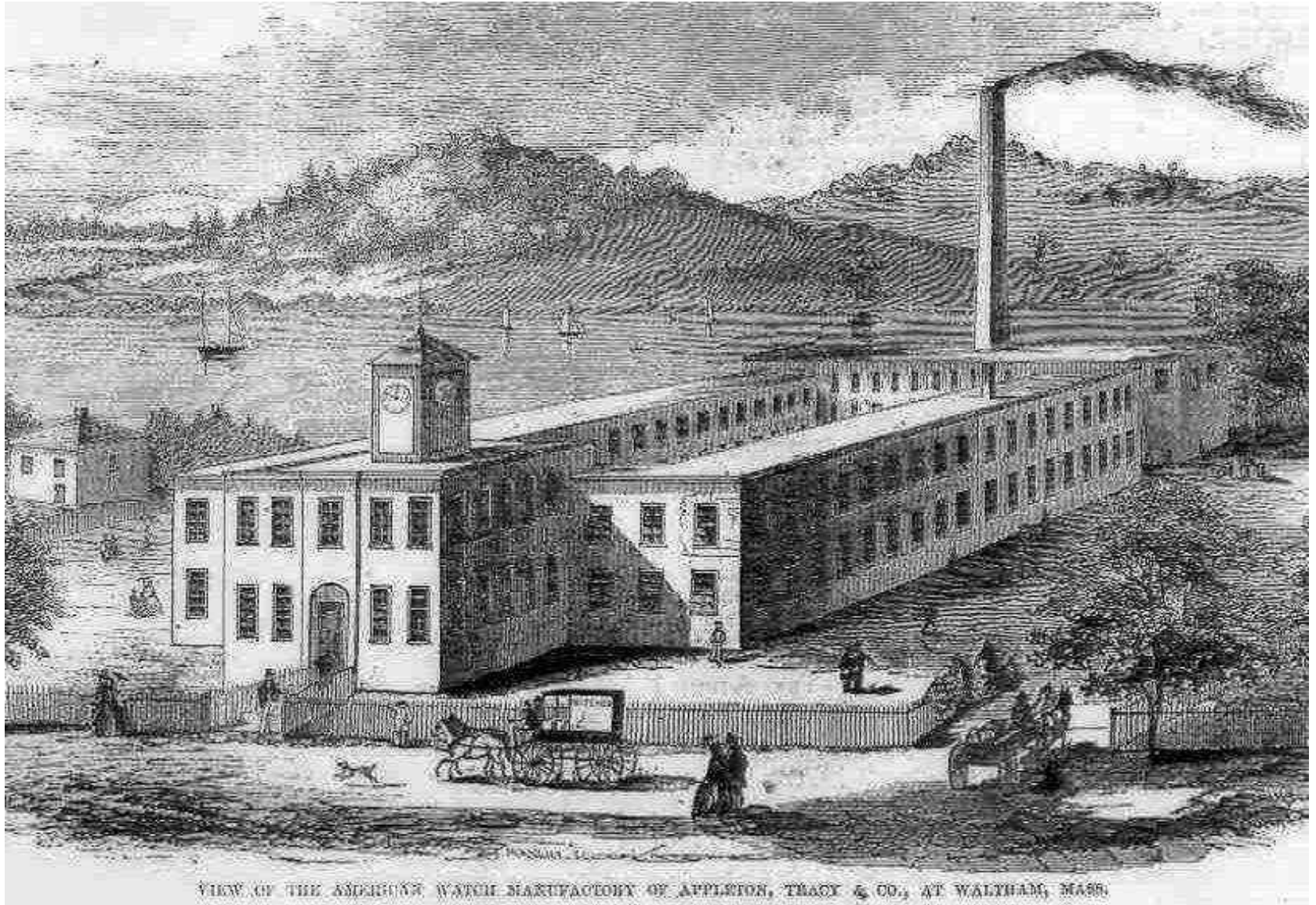
James Watt repaired the Newcomen engine and noticed how inefficient it was. He therefore created a separate condensation chamber. This caused condensation without a significant loss of heat. This image is courtesy of history.com.

In 1802, an American inventor, Oliver Evans of Delaware, built the first high-pressure steam engine for powering machinery.



Oliver Evans' steam engine helped him to create a "fully automated flour mill." It would later be used for locomotives and steamboats. This image is courtesy of the Library of Congress.

As a result of Evan's steam engine, factories not longer had to be built right next to streams or rivers.



The Anderson Watch Manufacturing in Waltham, Massachusetts made pocket watches. There is some water in the background of this picture. This image is courtesy of todayinsocialsciences.blogspot.com.

The Industrial Revolution did not get started in the United States until the early 1800s.



This is Slater Mill on the Blackstone River, in Pawtucket, Rhode Island. This image by Forest J. Handford is courtesy of Wikimedia Commons.

Before the Industrial Revolution, the United States produced mainly raw materials such as cotton, lumber, iron, and wheat.



Many early settlers made their living by logging, not only to build homes, but to construct other items such as ships. This image, created in 1856, was created by John S. Springer. It is courtesy of newbostonhistoricalsociety.com.

Although mills powered by water ground corn and wheat into flour and meal, almost everything else was made by hand.



This is the Brown-Lanier Mill located near Mill Springs, Kentucky, near the Cumberland River. It is still an active mill. This image was taken by Robert Housch on Saturday, June 5, 2009.

To start a Mill, one of the first items is to find a good source of running water.

Watch this video by [clicking here: https://youtu.be/f0VJnp1STVU](https://youtu.be/f0VJnp1STVU)



This is a stream located near the Brown-Lanier Mill near Mill Springs, Kentucky. In this scene we see the stream flow into the Cumberland River. This image was taken by Robert Housch on Saturday, June 5, 2009.

To control the water, you need to construct a dam.



This is the dam constructed to harness the stream flowing near the Brown-Lanier Mill near Mill Springs, Kentucky.. This image was taken by Robert Housch on Saturday, June 5, 2009.

You need to construct your mill.



This is the Brown-Lanier Mill near Mill Springs, Kentucky.. This image was taken by Robert Housch on Saturday, June 5, 2009.

You should have a pipe, or at that time an open wooden trough, carrying water from the dam to the wheel of the mill.



This is the Brown-Lanier Mill near Mill Springs, Kentucky.. The dam is out of sight on the right, so the water flows from right to left. This image was taken by Robert Housch on Saturday, June 5, 2009.

To give you a better idea of this location...

Watch this video by [clicking here: https://youtu.be/48bOnub0zoE](https://youtu.be/48bOnub0zoE)



This video which we will show you in class, shows the water flowing from the dam on the right to the mill on the left. This image was taken by Robert Housch on Saturday, June 5, 2009.

This is an “overshot” wheel, so the water hits the wheel from the top.

Watch this video by [clicking here: https://youtu.be/9lQo4FQ8JvQ](https://youtu.be/9lQo4FQ8JvQ)



This video which we will show you in class, shows that at first they had the “brake” on to stop the wheel from turning. Then you will slowly see the wheel turn. This image was taken by Robert Housch on Saturday, June 5, 2009.

The movement of the wheel by the water turns the gears and other machine parts inside of the mill.

Watch this video by [clicking here: https://youtu.be/rEWNNe0UHTQg](https://youtu.be/rEWNNe0UHTQg)



Most of these machine parts are actually outside of the mill underneath a shelter. This image was taken by Robert Housch on Saturday, June 5, 2009.

Inside the mill, grain is poured into a “hopper” which has a hole in the bottom.



The corn goes down the tube where two millstones grind it into flour. This image was taken by Robert Housch on Saturday, June 5, 2009.

Millstones come in pairs. At the bottom is a bedstone. Above the bedstone is a turning runner stone, which actually does the grinding.



This is a bedstone. The deep grooves are called furrongs. The flour exits between the grooves or furrongs of the stone on the sides of the stones. This image was taken by Robert Housch on Saturday, June 5, 2009.

The flour comes out the sides of the millstones into a meal spout where it can be placed into a bag.



From the meal spout, on the right, the meal goes into another hopper which has a screen to further sift the flour. This image was taken by Robert Housch on Saturday, June 5, 2009.

See if you can see how fast the runner stone is turning. It usually averages 125 revolutions per minute.

Watch this video by [clicking here: https://youtu.be/_FI4jEWNZDk](https://youtu.be/_FI4jEWNZDk)



In the video which I hope to show you in class, the corn is dropping down the hopper into the millstones. This image was taken by Robert Housch on Saturday, June 5, 2009.

Before the American Revolution, the colonies had depended on Britain for manufactured goods.



This photograph shows a Wedgwood pearlware blue and white pottery plate decorated with a Chinese Vase pattern. The Wedgwood Company began in 1759. This place was created circa 1820. This image is courtesy of cathcartantiques.com.au.

After independence, however, Americans were free to make manufactured goods of their own.



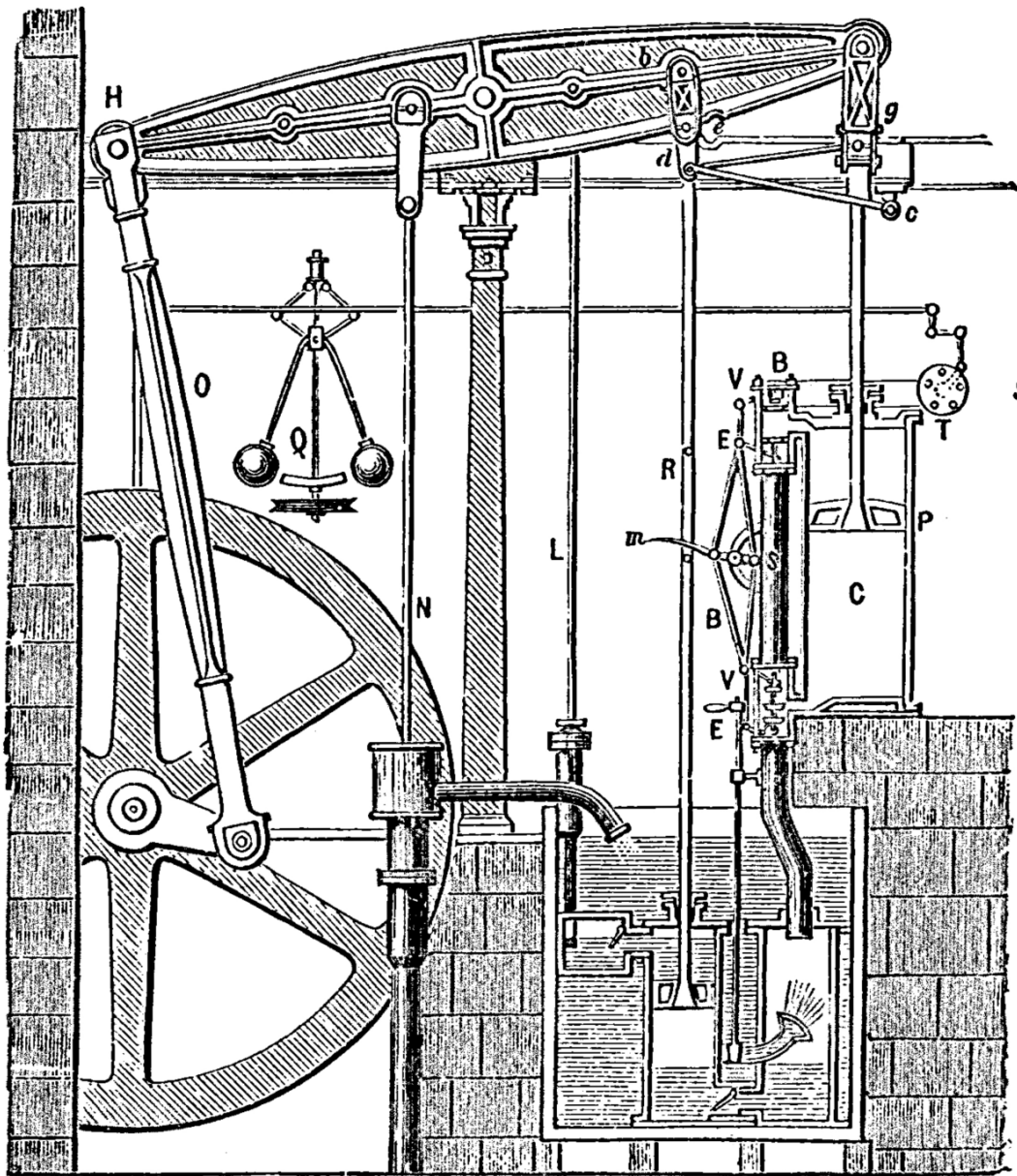
This pewter plate was created in the United States circa 1780. This image is courtesy of the Thomas Dale Company.

Some states offered rewards to people from Britain who would bring their knowledge of machines and industry to America.



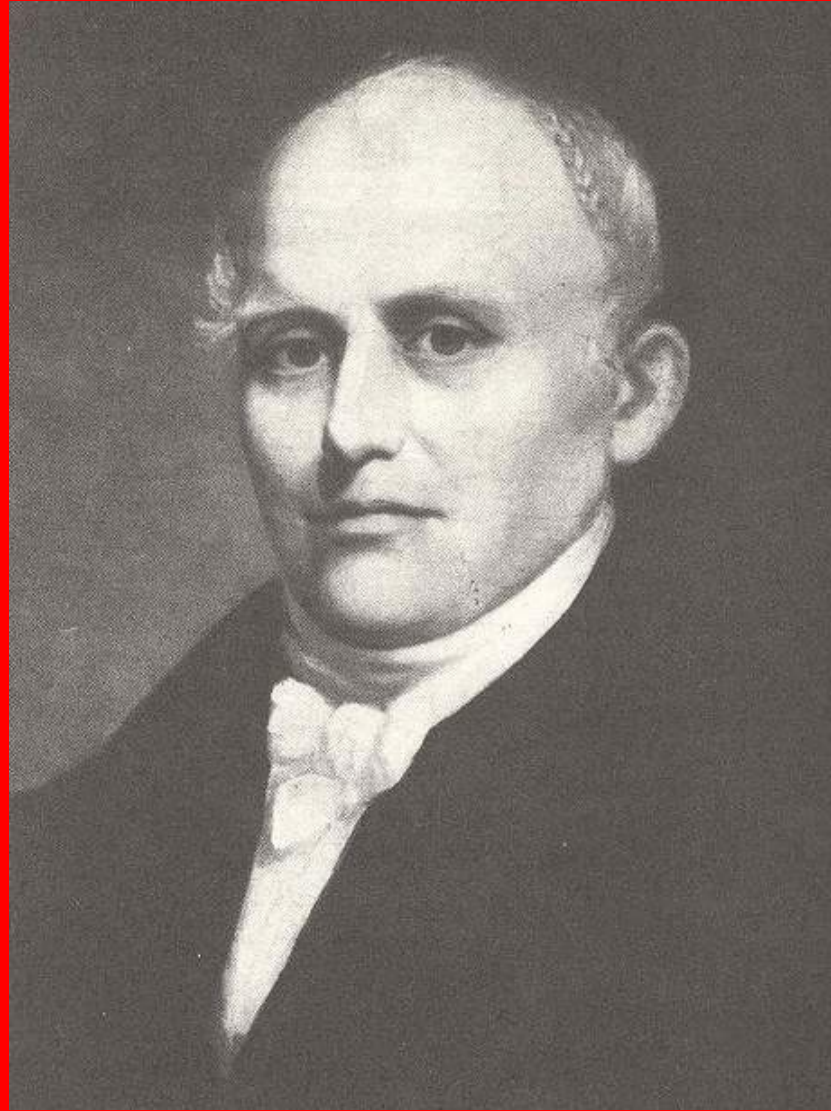
This British passenger ship was constructed much later than the time period of around 1800 when the United States was asking for individuals with knowledge of industry to come to America. This ship, the *Star of India*, was launched in 1861. This image is courtesy of columbia.edu.

The United States was able to steal the secrets of other countries.



This image shows the plans for the Boulton & Watt steam engine, circa 1784. This image is courtesy of Wikimedia Commons.

In 1789 Samuel Slater, a 21-year-old apprentice in Arkwright's textile mill in England, memorized the design of the machinery.



He traveled in disguise to the United States. Once in New York, Slater offered his services to Moses Brown, a wealthy Quaker who owned an inefficient cotton mill in Pawtucket, Rhode Island. This image is courtesy of Wikimedia Commons.

Within a year, Slater re-created from memory Arkwright's cotton mill.



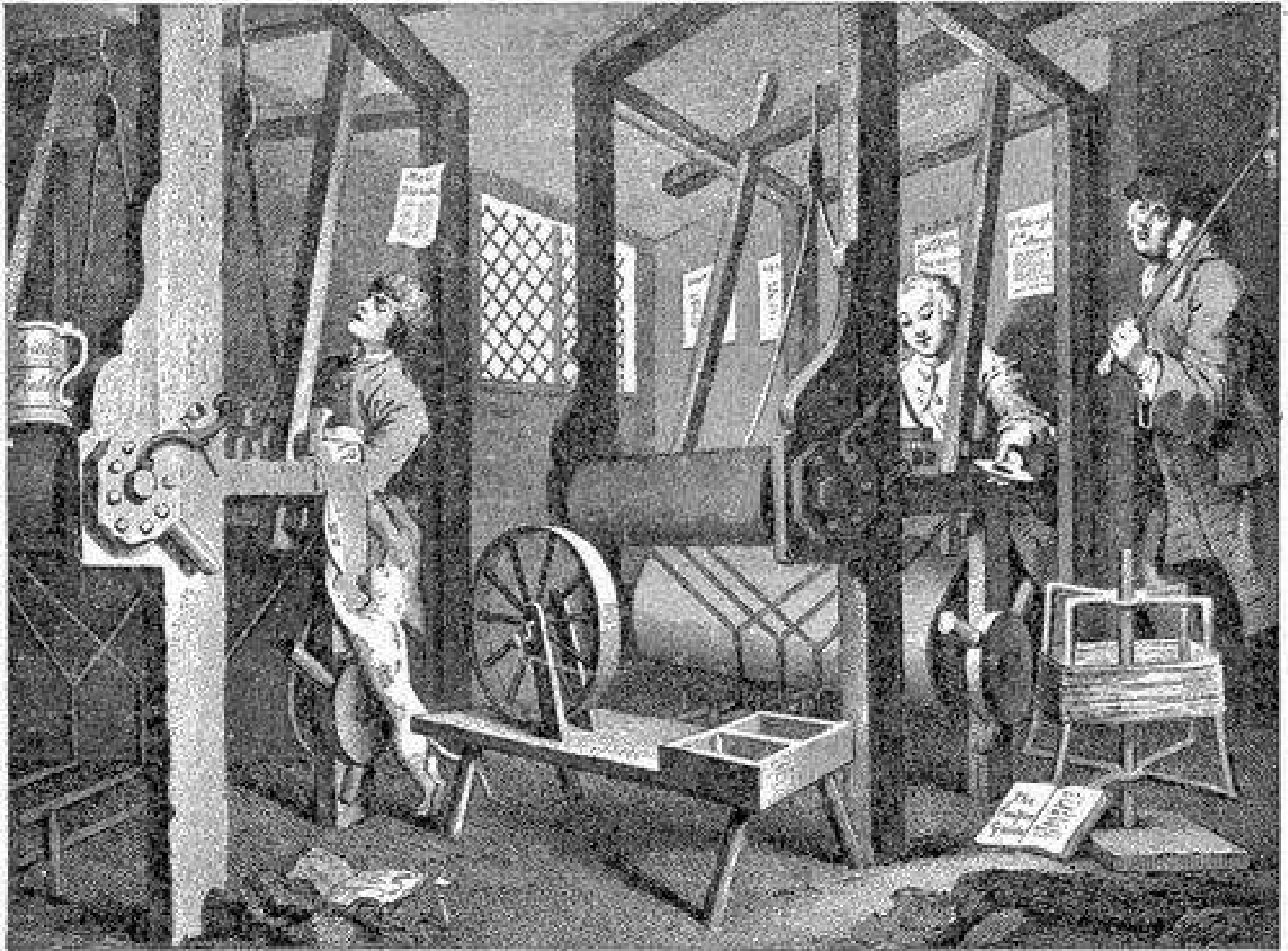
This is an early example of a wide spinning loom located at Slater Mill in Pawtucket, Rhode Island. This image is courtesy of slatermill.org.

Thanks in part to the region's many swift-running rivers, the Northeast soon became the industrial center of the United States.



This photograph is a view of Slater Mill along the Blackstone River in Pawtucket, Rhode Island. This image is courtesy of city-data.com.

At first American textile factories produced only yarn and thread.



Families working at home still used hand looms to weave yarn and thread into cloth. This image is courtesy of mccordgenealogy.blogspot.com.

In 1813 a young Bostonian, Francis Cabot Lowell, took another step in industrialization.



After seeing power looms in Britain, Lowell built one himself. There are no surviving portraits of Francis Cabot Lowell (1775-1817), so this silhouette is commonly used. This image is courtesy of Wikimedia Commons.

Lowell then placed the looms along with thread-spinning spindles in a new factory at Waltham, Massachusetts.



The Boston Manufacturing Company, founded by Francis Lowell, existed from 1813-1816 in Waltham, Massachusetts. This image is courtesy of Wikimedia Commons.

Now, for the first time, the entire process of converting cotton into cloth took place in one building.



The Boott Cotton Mill in Lowell, Massachusetts is now a unit of the National Park Service. This image is courtesy of softsolder.com.

LEQ: What industry was first affected by the Industrial Revolution?



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Eli Whitney, who had invented the cotton gin, came up with another idea that spurred the Industrial Revolution.

GUN MAKING.

PLATE CCLXXXV.

Fig. 5.



Fig. 6.

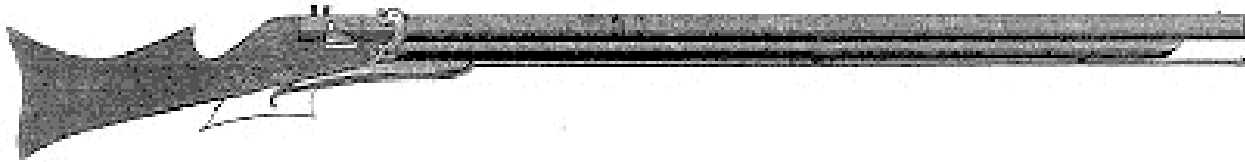


Fig. 9.

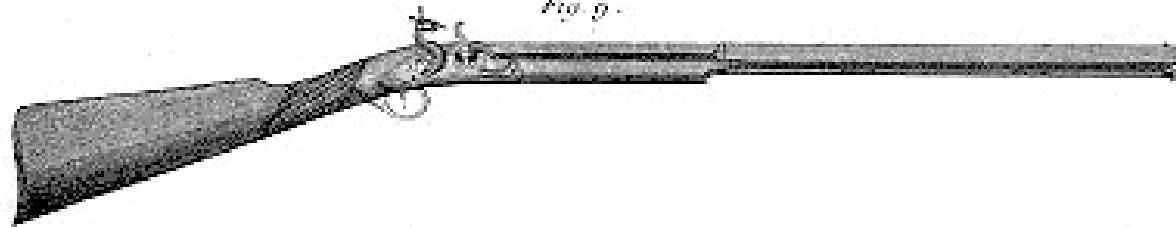


Fig. 7.



Fig. 8.

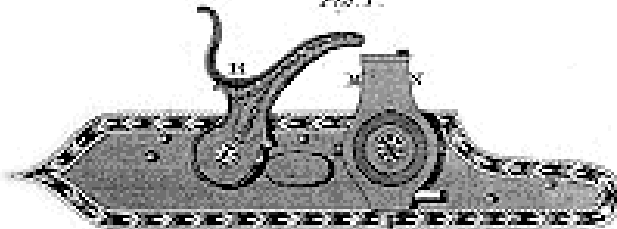
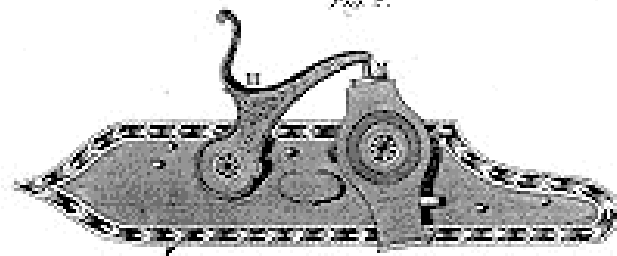
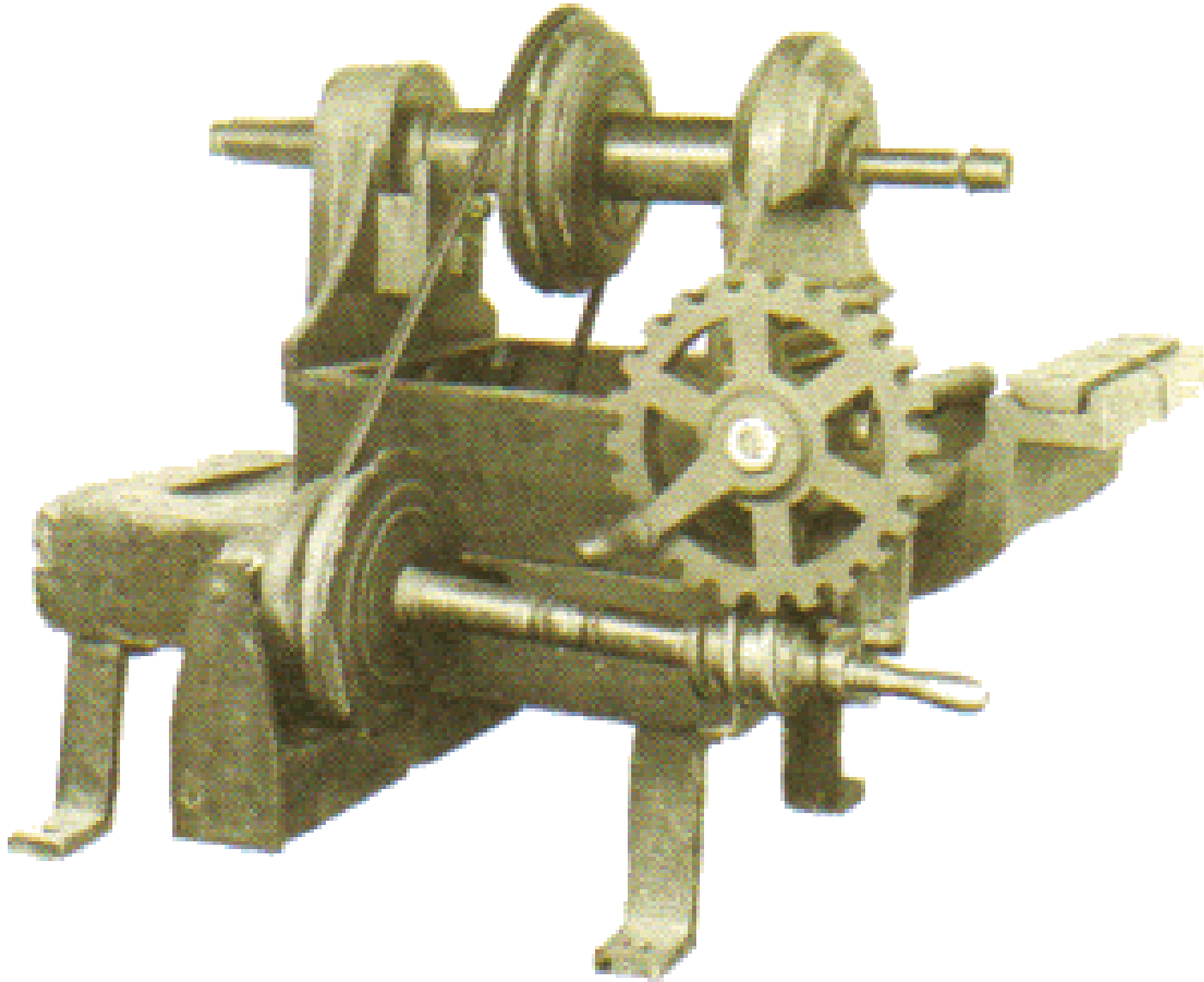


Fig. 10.



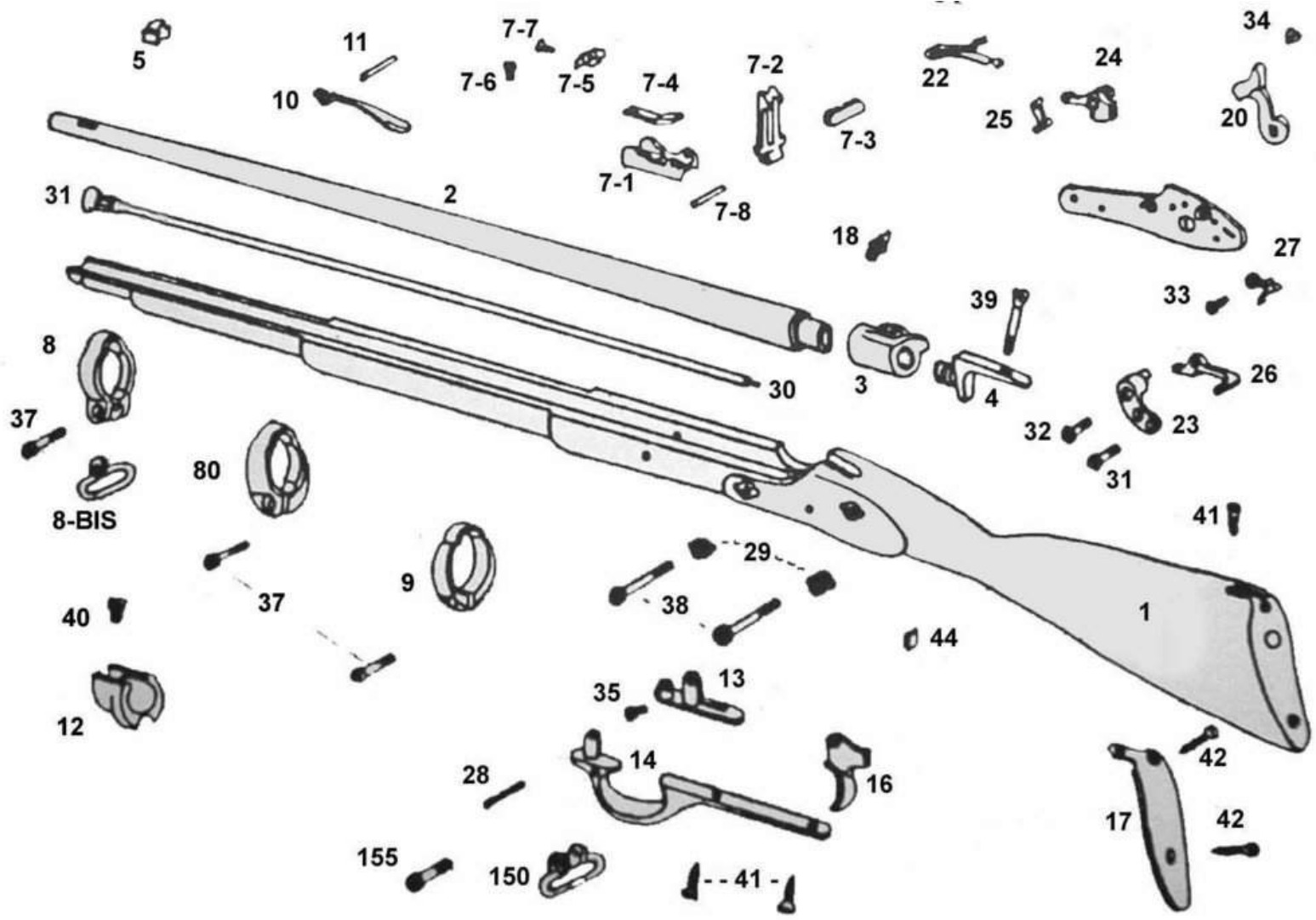
He thought of a new way to manufacture guns. This image is from the 1832 *Edinburgh Encyclopedia*.

He invented a machine that made it possible for workers to cut pieces of metal in exactly the same shape every time.



This milling machine may or may not have been invented by Eli Whitney. It was invented circa 1818. This image is courtesy of Wikimedia Commons.

With such a device, each part of a gun could be made in large numbers— all exactly alike.



Eli Whitney had built a factory in New Haven, Connecticut, but was about to lose a government contract on arms. He impressed the government representatives by mixing gun parts up and quickly reassembling them. This image of many parts of a gun is courtesy of ccbates.edu.

Not only were guns being made that were exactly alike,
it now became easy to replace broken parts.



This image is an advertisement for Eli Whitney's Company, located in New Haven, Connecticut. This image is courtesy of Wikimedia Commons.

This system of making interchangeable parts, or parts that are exactly alike, revolutionized gun making.



This image shows Eli Whitney's Armory in New Haven, Connecticut. The factory complex as known as Whitneyville. . It was painted in 1827 by William Giles Munson. This image is courtesy of Wikimedia Commons.

While some workers cut metal with patterns, others put the gun parts together.



These are not workers in Eli Whitney's gun factory. These are workers in an assembly line in Henry Ford's automobile factory in 1913. This image is courtesy of Wikimedia Commons.

Dividing up the work in this way and giving each worker one or two simple jobs to do is called division of labor.



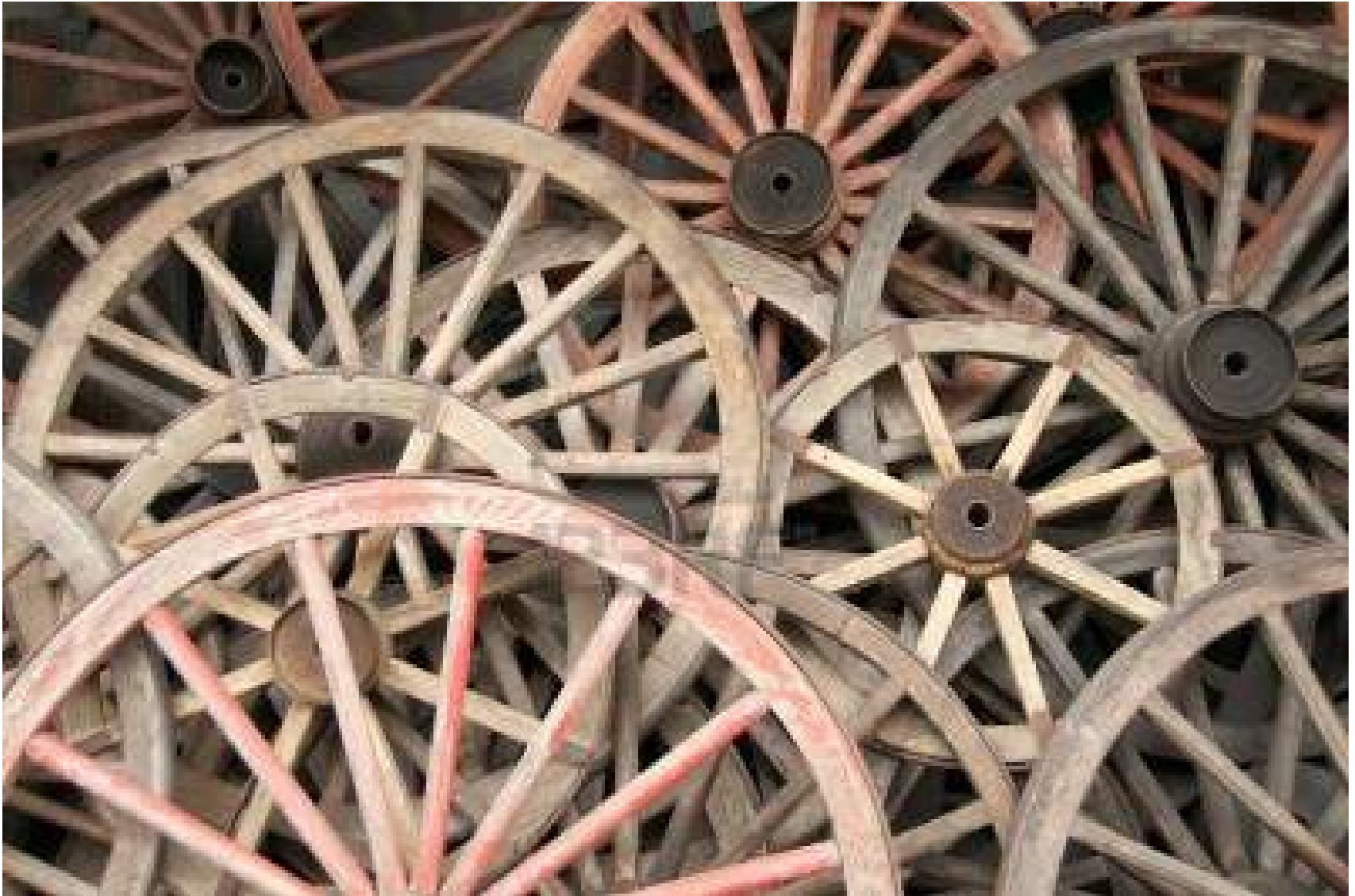
If one has only one or two tasks to do, they might easily become bored with their job. This situation is different from craftsmen who make all the parts of an object. This image is courtesy of premodeconhist.wordpress.com.

Interchangeable parts, division of labor, and other new manufacturing methods made mass production of goods possible.



This meant that goods could be made in large quantities, in a short time, for less cost. This image from the 1860s is courtesy of The Library of Congress.

Before long, factories were producing such items as wagon wheels, stoves, axes, and other tools.



This photograph shows a collection of old wagon wheels shows different types of wood used in their production. This image is courtesy of 123rf.com.

The Industrial Revolution changed people's lives. Artisans who made goods in their homes now had to compete with factory-made goods.



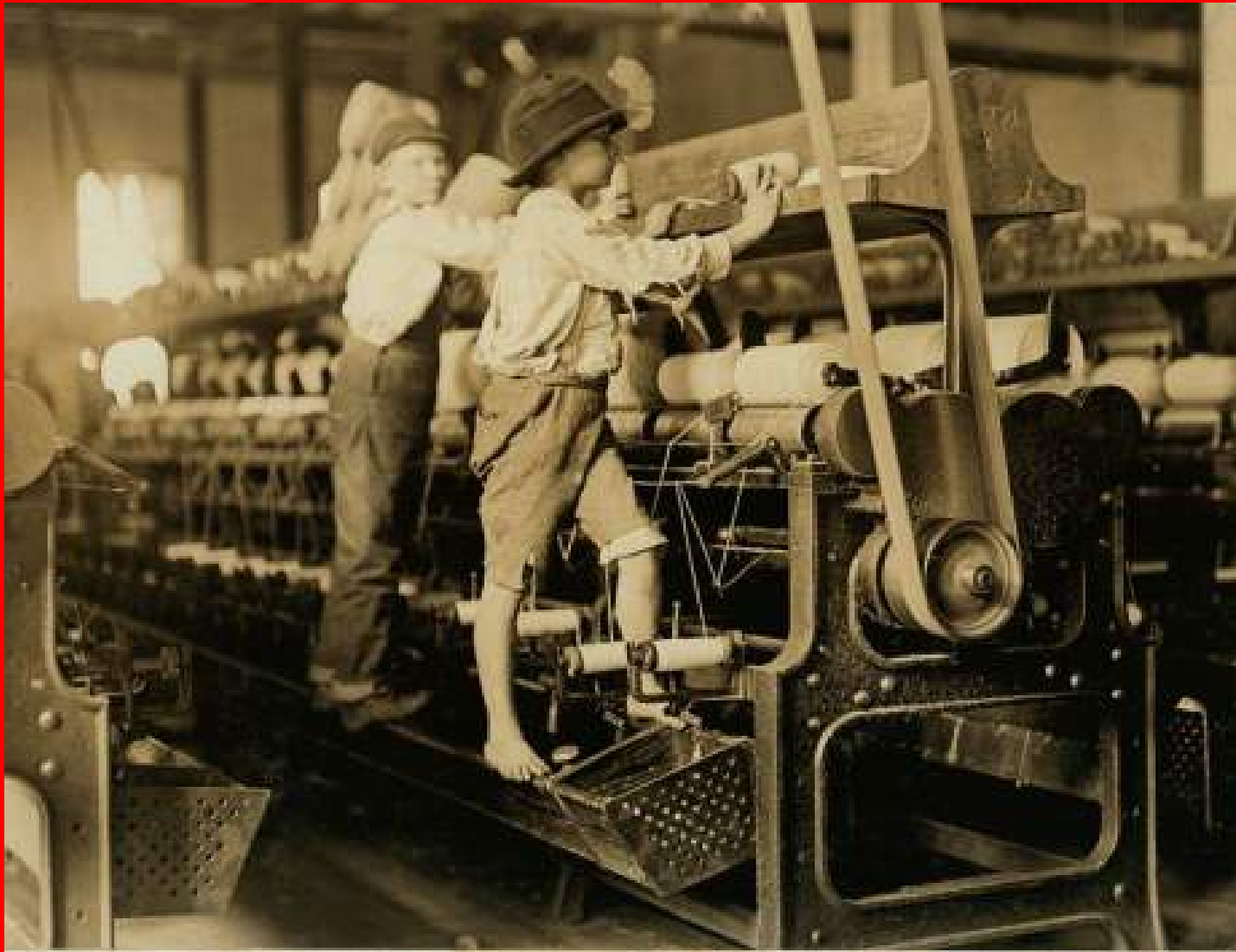
Many people left family farms and shops to work in the new factories. For some it meant new opportunities, but for many it meant a new kind of drudgery. This image is courtesy of uni.edu.

Women and children made up a large percentage of workers in factories because they could be paid less than men.



Because wages were low, entire families sometimes had to go to work in a factory. This image of a “bobbin girl” from the 1870s is courtesy of the National Park Service at Lowell National Historic Park

Factory workers put in long hours-- 12 to 14 hours a day, 6 days a week—often in unsafe and unhealthy working conditions.



This textile mill commonly hired children who were too young to reach the tops of the machines on which they were working, to retrieve cones of threads. Notice how the boy in front has to climb up on the machine, and he has bare feet. This 1909 image is courtesy of mentalfloss.com.

Bad lighting and poor ventilation harmed the workers' health, and were typical of American industry during the 1800s.



These boys processing the impurities from coal by hand do not have anything to protect them from having the coal dust go into their lungs. Overseers with sticks are standing to hit the boys, if necessary, to keep them working.

This image from 1911 is courtesy of mentalfloss.com.

As machines replaced hand tools, jobs for skilled craft workers became scarce.



Before industrialization, there had been enjoyment in skilled work and pride in good handicraft. Now workers in factories tended to machines, performed the same tasks over and over, and took little pride in the completed product. This image by Charles Grant Beauregard (1856-1919) is courtesy of islandbreath.blogspot.com.

In an effort to improve their working conditions, workers organized into labor unions.



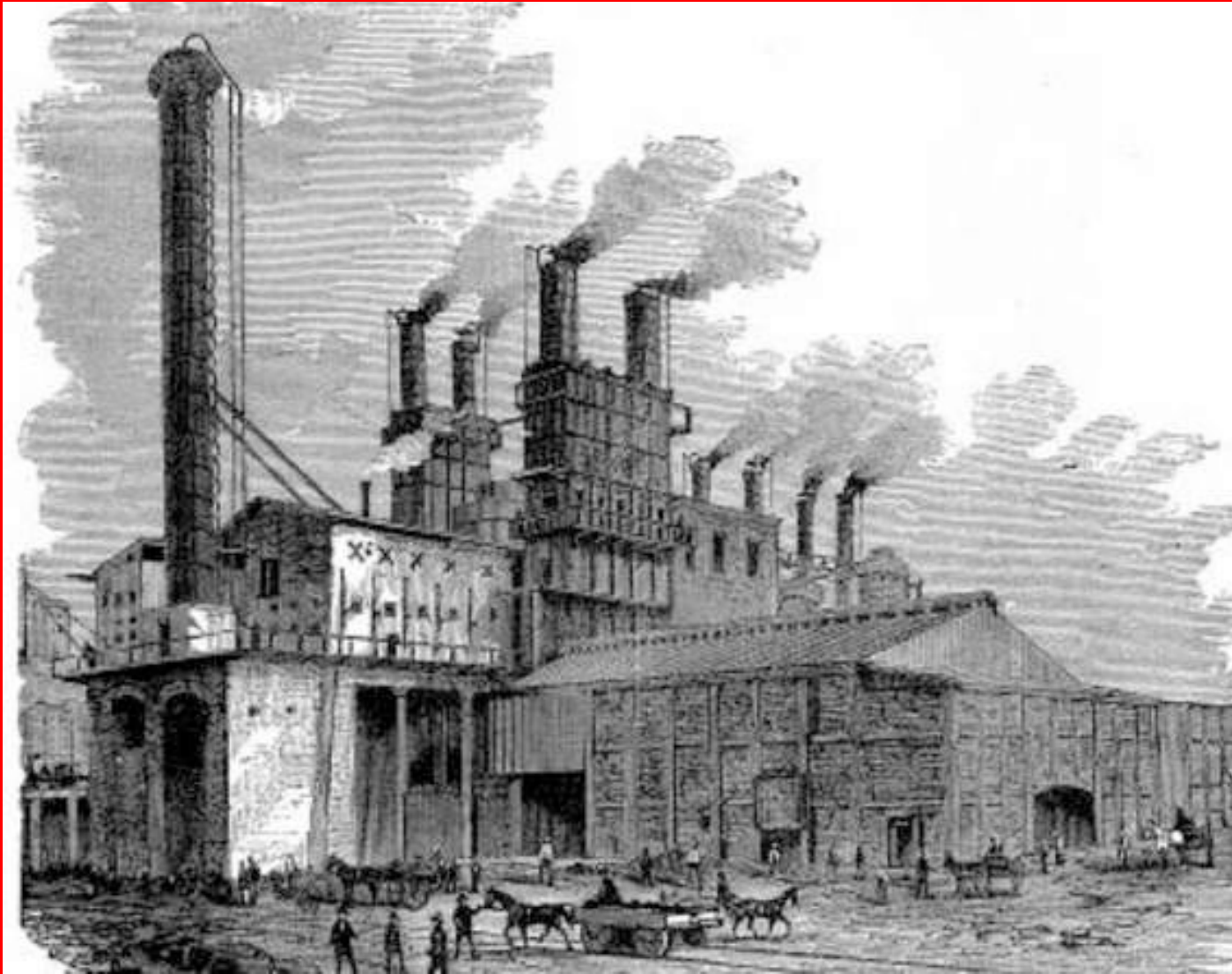
Labor unions demanded higher wages and better working conditions. Skilled artisans, such as carpenters, shoemakers, and printers, formed the first labor unions in the United States. Later unskilled laborers and female workers began to organize. They also had laws passed to stop child labor. This image is courtesy of teacherlink.org.

In 1810 about 90 percent of the American population still lived on farms.



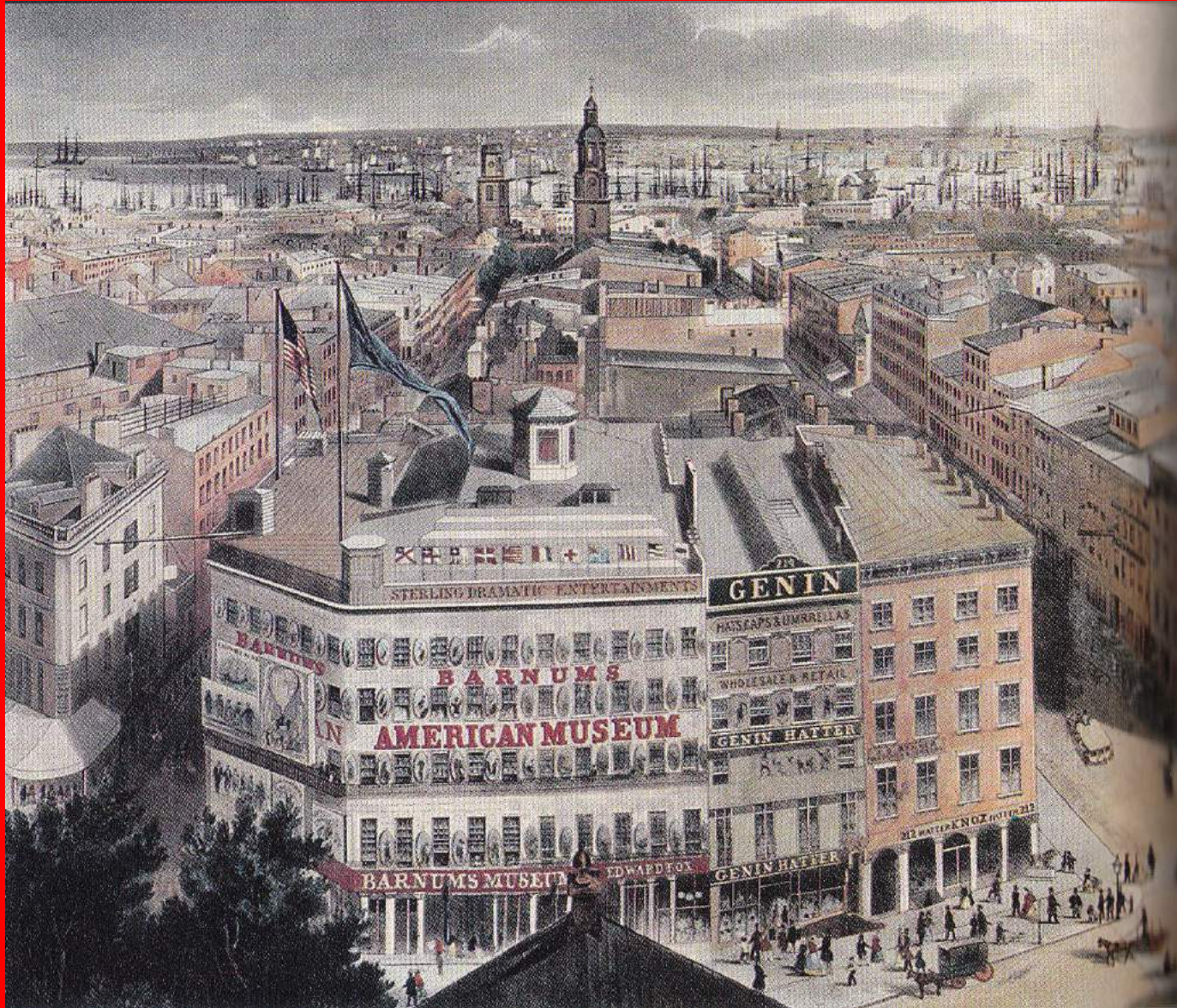
New York City ranked as the United States' largest city with 96,000 people in 1810 to 203,000 people in 1830. This image by Augustus Kollner of New York's Broadway was painted circa 1850. It is courtesy of fineartamerica.com.

The spread of the factory system and mass production caused cities to grow as more people moved to be near new factories.



Because of the pollution put out by these coal powered factories, the middle class and upper class usually lived farther away. Poorer families without transportation lived closer to the factories and their pollution. This image is courtesy of ehow.com.

Cities offered more job opportunities and better chances for education, as well as libraries, theaters, and other kinds of entertainment.



P.T. Barnum's American Museum was located on Broadway in New York City. Barnum advertised over 100,000 "curiosities" for visitors to see including animals and humans with birth defects. This image is courtesy of gmu.edu.

Even in colonial times, however, cities had been troubled by problems with clean water, fire protection, and public health.



Barnum's American Museum caught fire three times before P.T. Barnum decided not to reopen it. This was the 1865 fire. This painting by C.P. Cranch is courtesy of the New York Times.

As cities grew, these problems worsened and new ones developed when large groups of newcomers from the country settled in factory areas.



If people can't purchase what the factories are producing, then the factories have to lay off employees or close. People lose their jobs. Many families were crowded into small living areas. This image was taken circa 1890 by Jacob Riis. It is courtesy of studenthandouts.com.

Housing around factories became overcrowded, rundown, and unhealthy to live in. Crime also became a problem.



One of the most infamous tenement areas in New York City was Five Points. This image is courtesy of irishshinnyc.freeservice.com.

The problem of poverty in great industrial cities inspired a number of people to try to help.



Elizabeth Ann Seton (1774-1821) was left a widow at the age of 29. Although she had five children to raise alone, she saw the need for free education for the poor. This image is courtesy of catholicseeking.blogspot.com.

A convert to Roman Catholicism, she put her efforts into opening a free catholic elementary school in Baltimore, Maryland.



She established this school in 1808. It is now known as the Mother Seton House. Her children attended the school along with the children of recent immigrants. This academy moved to Emmitsburg, Maryland in 1809. The image is courtesy of Wikimedia Commons.

A few years later in 1809, Seton founded a religious order called the Sisters of Charity, the first such order founded in the United States.



Elizabeth Ann Seton

Elizabeth Ann Seton took vows of poverty, chastity and obedience on March 25, 1809 and was given the title of "Mother" by Archbishop John Carroll. The image is courtesy of svdpusa.org.

Now called Mother Seton, she led this group of nuns in helping the sick and establishing orphanages.



By the time of the American Civil War, the Sisters of Charity were known by their distinctive white headgear. They are posing at Satterlee Military Hospital in Philadelphia during the American Civil War. This image is courtesy of pahrc.net.

Mother Seton is the founder of the Catholic parochial, or private church-sponsored, school system in the United States.



This reconstructed log building, covered with clapboard siding and painted white, was occupied by Mother Seton and her school, the Saint Joseph's Academy, in 1810. She died in the building located here in 1821. This image was taken by Robert Housch on Sunday, April 19, 2009.

In 1975 she became the first native-born American canonized—made a saint— by the Roman Catholic Church.



Mother Elizabeth Ann Seton (1774-1821) was married at the age of 19 and widowed at the age of 29. This painting by William Guy Wall (1792-1864) is courtesy of piercedhearts.org.

LEQ: What industry was first affected by the Industrial Revolution?



Power loom weaving is shown in this illustration titled, "The Interior of a Cotton Mill." This painting by Thomas Allom (1804-1872) is courtesy of firststart.com.

LEQ: What industry was first affected by the Industrial Revolution?
The Textile Industry



Power loom weaving is shown in this illustration titled, "The Interior of a Cotton Mill." This painting by Thomas Allom (1804-1872) is courtesy of firststart.com.