

# Elisha Otis

Born 1811.

Inventor of the safety elevator.

Available online at [www.livesretold.co.uk](http://www.livesretold.co.uk)



*'All safe!'*

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*This life story was compiled in 2021, with acknowledgement and thanks, from internet sources.*



UNIV. OF  
CALIFORNIA

*E. G. Otis*

# 1. Early Years

*Chapters 1 to 3 were archived in 2021, with acknowledgement and thanks, from Wikipedia.*

Elisha Graves Otis (August 3, 1811 – April 8, 1861) was an American industrialist, founder of the Otis Elevator Company, and inventor of a safety device that prevents elevators from falling if the hoisting cable fails.

Elisha Otis was born in Halifax, Vermont, to Stephen Otis and Phoebe Glynn. He moved away from home at the age of 19, eventually settling in Troy, New York, where he lived for five years employed as a wagon driver. In 1834, he married Susan A. Houghton. They would have two children, Charles and Norton.

Later that year, Otis suffered a terrible case of pneumonia which nearly killed him, but he earned enough money to move his wife and three-year-old son to the Vermont Hills on the Green River. He designed and built his own gristmill, but did not earn enough money from it, so he converted it into a sawmill, yet still did not attract customers. Now having a second son, he started building wagons and carriages, at which he was fairly skilled. His wife later died, leaving Otis with two sons, one age 8 and the other in infancy.

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## 2. Success and setback

At 34 years old and hoping for a fresh start, he married and moved to Albany, New York. He worked as a doll maker for Otis Tingely. Skilled as a craftsman and tired of working all day to make only twelve toys, he invented and patented a robot turner. It could produce bedsteads four times as fast as could be done manually (about fifty a day). His boss gave him a bonus. Otis then started his own business.

At his leased building, he started designing a safety brake that could stop trains instantly and an automatic bread baking oven. He was put out of business when the stream he was using for a power supply was diverted by the city of Albany for its fresh water supply. In 1851, he first moved to Bergen City, New Jersey (now part of Jersey City), to work as a mechanic, then to Yonkers, New York, as a manager of an abandoned sawmill which he was supposed to convert into a bedstead factory.

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### 3. Lasting success

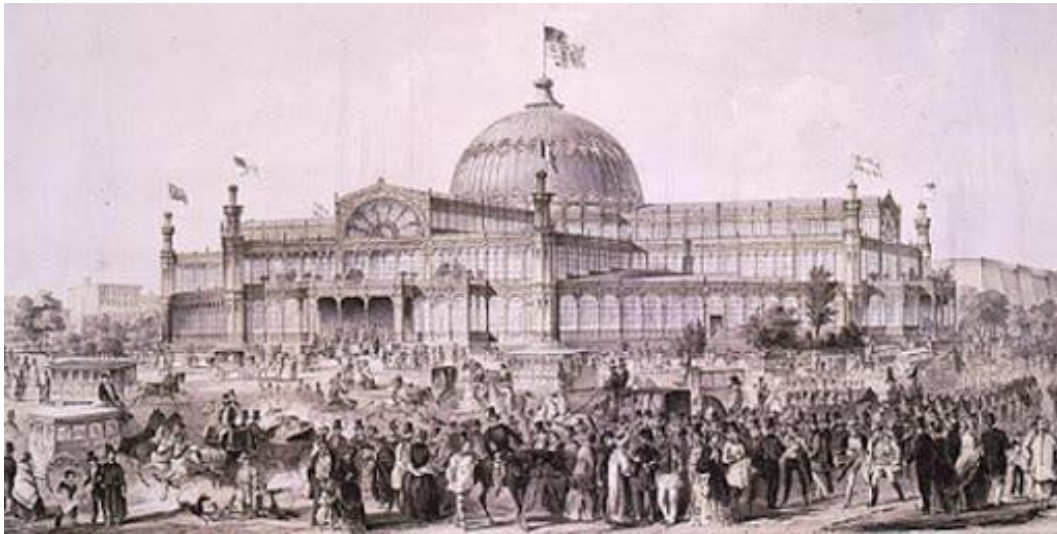
At the age of 40, while he was cleaning up the factory, he wondered how he could get all the old debris up to the upper levels of the factory. He had heard of hoisting platforms, but these often broke, and he was unwilling to take the risks. He and his sons, who were also tinkerers, designed their own "safety elevator" and tested it successfully. He initially thought so little of it he neither patented it nor requested a bonus from his superiors for it, nor did he try to sell it. After having made several sales, and after the bedstead factory declined, Otis took the opportunity to make an elevator company out of it, initially called Union Elevator Works and later Otis Brothers & Co.



*Otis free-fall safety demonstration in 1853.*

No orders came to him over the next several months, but soon after, the 1853 New York World's Fair offered a great chance at publicity. At the New York Crystal Palace, Otis amazed a crowd when he ordered the only rope holding the platform on which he was standing cut. The rope was severed by an axeman, and the platform fell only a few inches before

coming to a halt. The safety locking mechanism had worked, and people gained greater willingness to ride in traction elevators; these elevators quickly became the type in most common usage and helped make present-day skyscrapers possible.



*The Crystal Palace at the 1853 New York World's Fair, where Elisha Otis first demonstrated his safety elevator.*



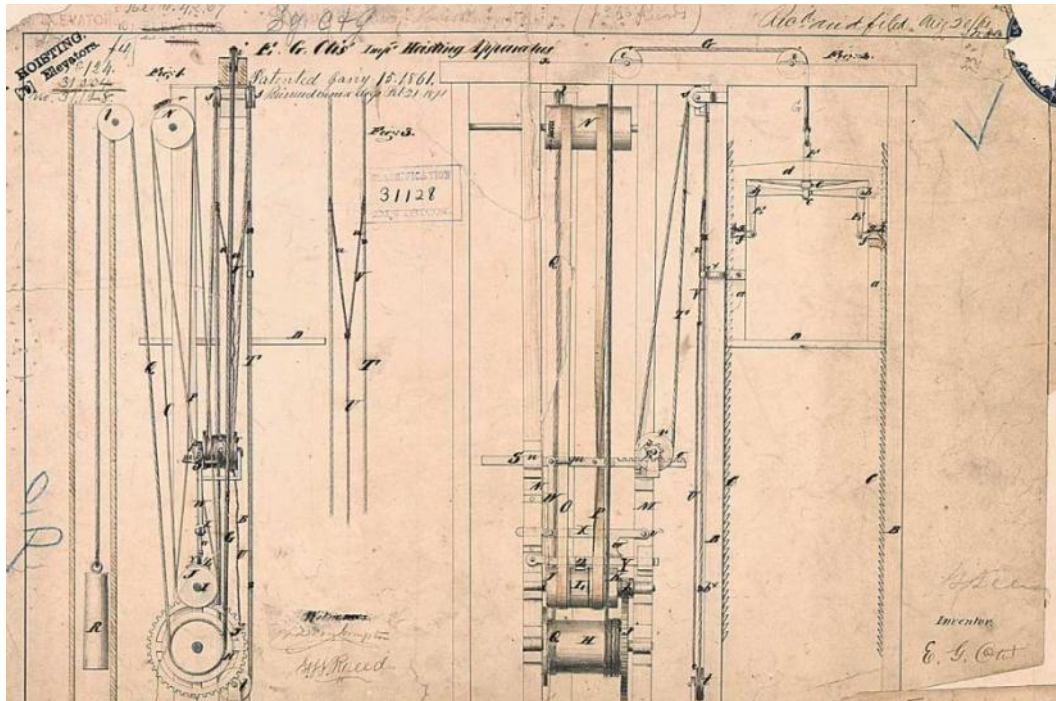
*On Oct. 5, 1858, in what is now known as Bryant Park, New York City, a majestic building of iron and glass, regarded worldwide as an architectural wonder, erupted in flames. Within a half-hour, the massive structure had collapsed, leaving little but black smoke and jagged debris in its wake.*

After the World's Fair, Otis received continuous orders, doubling each year. He developed different types of engines, like a three-way steam valve



engine, which could transition the elevator between up and down, and quickly stop it.

In his spare time, Elisha Otis designed and experimented with his old designs of bread-baking ovens and train brakes, and patented a steam plow in 1857, a rotary oven in 1858, and, with his son Charles, the oscillating steam engine in 1860. Otis contracted diphtheria and died on April 8, 1861 at age of 49.



A drawing from Elisha Otis' patent for an elevator safety brake.

## 4. How Otis Enabled Skyscrapers

*The following chapter was archived in 2021, with acknowledgement and thanks, from the 6sqt.com website. It was written in October 2016 by Diane Pham.*

Advances in engineering continue to push modern skyscrapers to dizzying new heights, but at the core of these structures, quite literally, is an often overlooked technology that's been key to their proliferation: the elevator.

The earliest known reference to the elevator was by Roman architect Vitruvius, who reported that Archimedes built his first elevator around 236 B.C. The design was fairly rudimentary, a platform using pulleys and hoisted by hand or by animal. While elevators found their way into countless buildings and homes in the centuries that followed, including that of Louis XV who used a private lift to connect his Versailles apartment to that of his mistress, it wasn't until the late 19th century that their true potential was unlocked.

In 1853, American industrialist Elisha Graves Otis took to the stage at World's Fair in New York to demonstrate his elevator safety brake. Otis had been working in a Yonkers, NY bedstead factory which required him to move heavy machinery between floors. Concerned with what would happen if the elevator's support rope broke, Otis devised what he called a "safety hoist," a steel wagon-spring meshing with a ratchet that ensured if the rope gave way, the spring would catch and keep the platform from plummeting and crushing everything below.

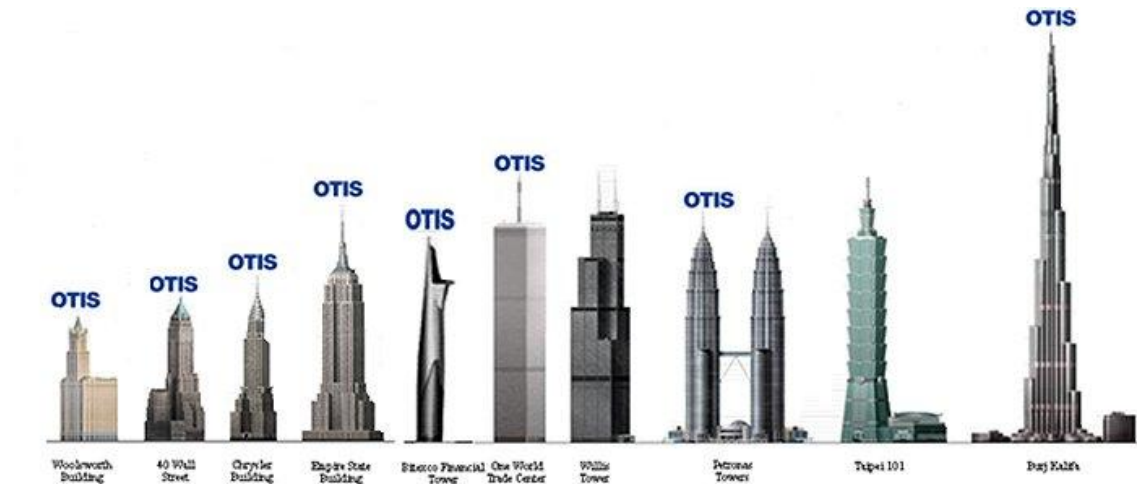
As recalled by the Otis Elevator Company, the inventor's grand debut at the World's Fair went something like this:

Perched on a hoisting platform high above the crowd at New York's Crystal Palace, a pragmatic mechanic shocked the crowd when he dramatically cut the only rope [with an axe] suspending the platform on which he was standing. The platform dropped a few inches, but then came to a stop. His revolutionary new safety brake had worked, stopping the platform from crashing to the ground. "All safe, gentlemen!" the man proclaimed.





In the years that followed, demand for Otis' elevators multiplied rapidly. His first public elevator was installed in the E.V. Haughwout & Co. department store at 488 Broadway on March 23, 1857, and in 1961 he patented a steam-powered elevator that could move up and down floors and brake immediately. Otis unfortunately died that same year at the age of 49, but his two sons, Charles and Norton, carried his vision beyond his death by establishing what today is known as the Otis Elevator Company—a name that can be found branded on thousands of elevators across the globe.



*Modern towers with otis elevators Famous towers that use Otis elevators.*

Although Otis' design has seen numerous alterations over the last 150-plus years, the concept remains largely the same; multiple steel cables are used now instead of a single rope, there are clamps that hold the chain above and below the car to prevent it from moving too far in one direction or another, and today's elevators also use electromagnetic brakes that close shut to prevent free fall if it loses power.

The elevator is arguably a tall tower's most critical design element when it comes to function, and Otis' safety brake has enabled skyscrapers to both exist and continue to stretch higher into the sky. Surely Otis could not have fathomed the impact his invention would have on modern construction.

## 5. Escalators

The Otis Company went from strength to strength in the 150 years since the death of Elisha Otis.



*The Otis escalator won first prize at the Paris Exposition Universelle of 1900.*

In addition to elevators, the Otis company pioneered the commercial development of escalators.

On March 15, 1892, Jesse W. Reno patented the "Endless Conveyor or Elevator." A few months after Reno's patent was approved, George A. Wheeler patented his ideas for a more recognizable moving staircase, though it was never built. Wheeler's patents were bought by Charles Seeberger; some features of Wheeler's designs were incorporated in Seeberger's prototype that was built by the Otis Elevator Company in 1899.

Around May 1895, Charles Seeberger began drawings on a form of escalator similar to those patented by Wheeler in 1892. This device consisted of flat, moving stairs, not unlike the escalators of today, except for one important detail: the step surface was smooth, with no comb effect to safely guide the rider's feet off at the ends. Instead, the passenger had to step off sideways. To facilitate this, at the top or bottom of the escalator the steps continued moving horizontally beyond the end of the handrail (like a miniature moving sidewalk) until they disappeared under a triangular "divider" which guided the passenger to either side.

Seeberger teamed with Otis in 1899, and together they produced the first commercial escalator. It won first prize at the 1900 Paris Exposition Universelle. Also on display at the Exposition were Reno's inclined elevator, a similar model by James M. Dodge and the Link Belt Machinery Co., and two different devices by the French manufacturers Hallé and Piat.

In the first half of the twentieth century, several manufacturers developed their own escalator products, though they had to market their devices under different names, due to Otis' hold on the trademark rights to the word "escalator." New York-based Peelle Company called their models the Motorstair, while Westinghouse called their model an Electric Stairway. The Toledo-based Haughton Elevator company referred to their product as simply Moving Stairs. The Otis trademark is no longer in effect.

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## 6. The Otis Company Today

*This chapter was archived in 2021, with acknowledgement and thanks, from parts of the Otis company's annual report for 2020.*

### **Moving People the World Over**

With customers in more than 200 countries and territories, we are globally recognized for our quality, safety and reliability. You will find us in the world's most iconic structures, as well as residential and commercial buildings, transportation hubs, and everywhere people are on the move. And whatever the post-pandemic world looks like, we embrace the view that diverse, resilient, livable cities remain our best hope for the future – as centers of community, innovation and economic opportunity.

### **A Part of People's Daily Lives**

We are local, everywhere. We operate through 1,400 branches and offices and maintain a local workforce in both metropolitan areas and community neighborhoods. We understand that trust is built on the knowledge and experience that can only be gained on the ground. Our 33,000 service mechanics are in the field talking with customers every day, making connections. We are their local elevator company.

### **Transforming daily life for urban commuters in Panama**



The Panama Canal remains among the world's most impressive infrastructure achievements. Now Panama has another landmark project: Central America's first metro system, built to relieve traffic congestion in Panama City and the western part of the country.



The transit authority tapped Otis to supply nearly 300 escalators and more than 120 elevators to ferry passengers from street level to the train platforms at 30 stations along Lines 1 & 2 of the new metro system. We developed a special interface to integrate the Otis EMS Panorama™ elevator management system with the metro’s own monitoring and control system to provide a single view of all operating systems, including the elevators and escalators.

### **Alto Tower: ‘Liberated architecture’ transforms La Défense skyline**



Located in La Défense business district in Paris, Alto Tower presents a daring silhouette as it rises 150 meters above street level, gradually flaring outward in graceful curves – from 600 square meters at its base to 1,800 square meters at the top. Its facade of glass scales adds to this sense of fluidity – what its architect calls “liberated architecture.” The contractor turned to Otis to custom engineer an elevator system best suited to the building’s unique shape.

Our solution: eight double-deck SkyRise® elevators, configured to take passengers directly to their destination without stopping at a transfer floor. On entering the building, passengers log their destination using our Compass® 360 destination dispatch system, which assigns them to the elevator that will get them to their destination the fastest. The tower also includes two single SkyRise elevators, two Gen2 elevators and two Otis escalators – used to reach the upper cab of the double-deck units.

## **Xiqu Centre: A stunning gateway into Hong Kong's new cultural district**



With its dramatic curvilinear facade and reinterpretation of the Moon Gate found in traditional Chinese gardens, the Xiqu Centre serves as a stunning gateway to Hong Kong's West Kowloon Cultural District, the city's new precinct for arts and culture. In keeping with its green design, the building features a dozen energy-efficient Gen2 elevators from Otis. Gen2 systems with ReGen® drives are capable of reducing energy consumption by 75% under normal operating conditions compared to conventional systems without regenerative technology.

## **The super-slim skyscrapers redefining urban skylines**





New York City's 520 Park Avenue belongs to a new generation of super-slim skyscrapers that are transforming urban skylines around the world – from Moscow to London, from Melbourne to Bangkok and Hong Kong.

A 64-story luxury residential tower clad in limestone, 520 Park Avenue features two custom-built Otis elevators. One is an elegantly outfitted passenger elevator paneled in French walnut. The other is a double-deck elevator – the lower cab reserved for passenger use, the upper cab programmed for service. Given the building's small footprint, a separate hoistway for a service elevator would have occupied too much precious space – a problem we solved with the unique double-deck configuration.



*An Otis escalator factory in China.*

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