

# HISTORY OF WHEELCHAIR

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**Abstract:** In hospitals and other facilities we see people using wheelchair for mobility and transport all the time. The origin of wheelchair can be traced back to an inscription found on a stone slate in China. The first known dedicated wheelchair (invented in 1595 and called an invalids chair) was made for Phillip II of Spain by an unknown inventor. In 1932, engineer, Harry Jennings, built the first folding, tubular steel wheelchair. That was the earliest wheelchair similar to what is in modern use today. The invention of wheelchair was stimulated by the desperation of the individuals with limited capacity to mobilize.

**Key words:** Wheelchair, Bath Chair, Harry Jennings, Invalid.

In hospitals and other facilities we see people using wheelchair for mobility and transport all the time. This simple invention has contributed to millions of lives over years. The transformation of an idea into reality is a journey with ups and downs. Human imagination forces development and progress in any invention. The iconic image of Stephen Hawking in the mind controlling electric wheelchair is a testament to human endurance and desire to achieve excellence.

It has been said that “necessity is the mother of all invention”, I imagine at some point in human history we have needed/wanted



to move the disabled and infirm from one place to another with some ease. Thus the invention of the wheelchair sprung forth.

## Origins of wheel chair

The origin of wheelchair can be traced back to an inscription found on a stone slate in China,

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dating between the 6th and 5th century BCE. The first records of wheeled seats being used for transporting disabled people date to three centuries later in China; the Chinese used early wheelbarrows to move people as well as heavy objects. A distinction between the two functions was not made for another several hundred years, around 525 CE, when images of wheeled chairs made specifically to carry people begin to occur in Chinese art.



Figure 1: Depiction of Chinese philosopher Confucius in a wheelchair, dating to ca. 1680

### The royal wheelchair

The origins of the first wheelchair, or who invented it are shrouded in uncertainty. The first known dedicated wheelchair (invented in 1595 and called an invalids chair) was made for Phillip II of Spain by an unknown inventor. Although the Europeans eventually developed a similar design, this method of transportation did not exist until 1595 when an unknown inventor from Spain built one for King Phillip II. Although it was an elaborate chair having both armrests and leg rests, the design still had shortcomings since it did not feature an efficient propulsion mechanism and thus, requires assistance to propel it. This makes the design more of a modern-day highchair or portable throne for the wealthy rather than a modern-day wheelchair for the disabled.



Figure 2; the royal wheelchair for Philip II of Spain

In 1655, Stephen Farfler, a paraplegic watchmaker, built a self-propelling chair on a three wheel chassis, using a system of cranks and cogwheels. However, the device had an appearance of a hand bike more than a wheelchair since the design included hand cranks mounted at the front wheel.



Figure 3 : first self-propelling wheelchair

### The Bath wheelchair

After individual models, this was the first wheelchair as mass production for common use produced on the British Isles. In 1783, John Dawson of Bath, England, invented a wheelchair named after the town of Bath. Dawson designed a chair with two large wheels and one small one. The Bath wheelchair outsold all other wheelchairs throughout the early part of the 19th century. However, the Bath wheelchair was not that comfortable and during the last half of the 19th century many improvements were made to wheelchairs. An 1869 patent for a wheelchair showed the first model with rear push wheels and small front casters. Between, 1867 to 1875, inventors added new hollow rubber wheels similar to those used on bicycles on metal rims. In 1881, the push rims for added self-propulsion were invented.



Figure 3 : Bath wheel chair

### Modern day wheel chair

In 1932, engineer, Harry Jennings, built the first folding, tubular steel wheelchair. That was the earliest wheelchair similar to what is in modern use today. That wheelchair was built for a paraplegic friend of Jennings called Herbert Everest. Everest had previously broken his back in a mining accident. Everest

and Jennings saw the business potential of the invention and went on to become the first mass-market manufacturers of wheelchairs. Their “X-brace” design is still in common use, albeit with updated materials and other improvements. The X-brace idea came to Harry from the men’s folding “camp chairs / stools”, rotated 90 degrees that Harry and Herbert used in the outdoors and at the mines.

Together they founded Everest & Jennings, a company that monopolized the wheelchair market for many years. The pair soon went into business to manufacture their improved design. In the 1940s, they supplied disabled veterans of World War II through government contracts that established the company as a recognized name in rehabilitation equipment. An antitrust suit was actually brought against Everest & Jennings by the Department of Justice, who charged the company with rigging wheelchair prices. The case was finally settled out of court.



Figure 4: first Everest and Jennings wheel chair

The first electric-powered wheelchair was invented by Canadian inventor, George Klein and his team of engineers while working for the National Research Council of Canada in a program to assist the injured veterans returning after World War II.

Atypical collaboration is at the core of thousands of innovations in the healthcare engineering field and more than a few involve Klein. But one of the most vivid examples is the development of the first mass-produced electric wheelchair — a design known in its day as “The Klein Chair.”

The story begins with the discovery and refinement of penicillin, which dramatically reduced the number of fatalities from wartime spinal cord injuries. During the First World War, a spinal injury resulted in almost certain death from ensuing infection. But by the Second World War, soldiers had an 80-90 per cent rate of survival from spinal injuries thanks to the revolutionary new antibiotic.

One of those Second World War survivors was John Counsell, a Canadian officer shot through the back at Dieppe. He would live the rest of his life with paraplegia. At first satisfied with manual wheelchairs, it became clear to Counsell that quadriplegics would need something more. His advocacy, and Canada’s particular commitment to health care and veterans support, came together in the post-war period to manifest as a request to NRC and Klein to build an entirely new wheelchair.

Klein considered the project to be the most rewarding of his career. In the end, he developed a unique package of technologies including the joystick, tighter turning systems and separate wheel drives that are

still features of electric wheelchairs today. After Canadian veterans were provided with their electric chairs, an international effort was made to engage manufacturers. This culminated in the formal transfer of the prototype chair to the United States Ambassador to Canada and the head of the U.S. Department of Veterans Affairs with patent-free rights to encourage production in the U.S. Within a few years, major wheelchair manufacturing companies had embraced the technology and made it available to disabled civilians en masse.



Figure 5 : Klien Chair; the first motorized wheelchair

### Mind Control

John Donoghue and Braingate invented a new wheelchair technology intended for a patient with very limited mobility, who otherwise would have issues using a wheelchair by themselves.

The Brain Gate device is implanted into the patient's brain and hooked to a computer to which the patient can send mental commands that results in any machine including wheelchairs doing what they want it to. The new technology is called BCI or brain-computer interface.

The invention of wheelchair was stimulated by the desperation of the individuals with limited capacity to mobilize. Wheelchair has developed from primitive chair on wheels to state of the art technology by the use of state of the art computer and mechanical technology.

Timeline of wheelchair	
530 B.C.	The first depiction of the wheelchair's predecessor, a wheeled child's bed appears on a Greek vase.
525 A.D.	The earliest evidence of the traditional wheelchair, a Chinese engraving of a chair with wheels attached.
1595	A special wheelchair is built for King Phillip II of Spain (1527-1598), called an "invalids chair"
1655	Stephan Farfler, a watchmaker and paraplegic builds the first three wheeled "self-propelled" wheelchair
1783	John Dawson of Bath England, created the "bath chair" which had two large wheels and one small wheel in the front. This would be the standard in wheelchairs for many years to come
1932	A lightweight collapsible wheelchair was invented by Harry Jennings & Herbert Everest. They had such control of the market that the US Department of Justice brought an anti-trust suit against them, which was settled out of court
1950	George Klein invents the first electric wheelchair, used to assist returning veterans from WWII

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