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Willis Carrier

Willis Haviland Carrier (November 26, 1876 – October 7, 1950) was an American engineer, best known for inventing modern air conditioning. Carrier invented the first electrical air conditioning unit in 1902. In 1915, he founded Carrier Corporation, a company specializing in the manufacture and distribution of heating, ventilation, and air conditioning (HVAC) systems.

Early life and education

Willis Haviland Carrier was born on November 26, 1876, in Angola, New York, the son of Duane Williams Carrier (1836–1908) and Elizabeth R. Haviland (1845–1888). He graduated from Angola Academy in 1894 and from the Buffalo High School in 1897.^{[2][3]}

He studied at Cornell University starting in 1897 and graduated in 1901 with a Master of Engineering degree.^{[4][5]}

Career

In Buffalo, New York, on July 17, 1902, in response to an air quality problem experienced at the Sackett-Wilhelms Lithographing & Publishing Company of Brooklyn, New York,^[6] Willis Carrier submitted drawings for what became recognized as the world's first modern air conditioning system. It was so humid in summer that the paper grew and shrank, which resulted in poor quality images, because the color printing process involved running the same piece of paper up to four times, each with a different color ink.^[7]

The 1902 installation marked the birth of air conditioning because of the addition of humidity control, which led to the recognition by authorities in the field that A/C must perform four basic functions:

- control temperature
- control humidity
- control air circulation and ventilation
- cleanse the air

Willis Carrier



Carrier in 1915

Born	Willis Haviland Carrier November 26, 1876 <u>Angola, New York</u>
Died	October 7, 1950 (aged 73) ^[1] New York City, New York
Resting place	<u>Forest Lawn Cemetery</u> , Buffalo, New York
Nationality	American
Alma mater	<u>Cornell University</u> (M.E.)
Occupation	Engineer
Known for	Inventing modern <u>air conditioning</u>
Spouses	Edith Claire Seymour (<u>m.</u> 1902; died 1912)

After several more years of refinement and field testing, on January 2, 1906, Carrier was granted U.S. Patent 808,897 (<https://patents.google.com/patent/US808897>) for an *Apparatus for Treating Air*, the world's first spray-type air conditioning equipment. It was designed to humidify or dehumidify air, heating water for the first function and cooling it for the second.

In 1906 Carrier discovered that "constant dew-point depression provided practically constant relative humidity," which later became known among air conditioning engineers as the "law of constant dew-point depression." On this discovery he based the design of an automatic control system, for which he filed a patent claim on May 17, 1907. U.S. Patent 1,085,971 (<https://patents.google.com/patent/US1085971>) was issued on February 3, 1914.

In 1908, the Carrier Air Conditioner Company of America was created as a subsidiary of the Buffalo Forge Company, with Willis Carrier as its vice president.^[8]

On December 3, 1911, Carrier presented what is perhaps the most significant document ever prepared on air conditioning – *Rational Psychrometric Formulae* – at the annual meeting of the American Society of Mechanical Engineers. It became known as the "Magna Carta of Psychrometrics."^{[8][9]} This document tied together the concepts of relative humidity, absolute humidity, and dew-point temperature, thus making it possible to design air-conditioning systems to precisely fit the requirements at hand.

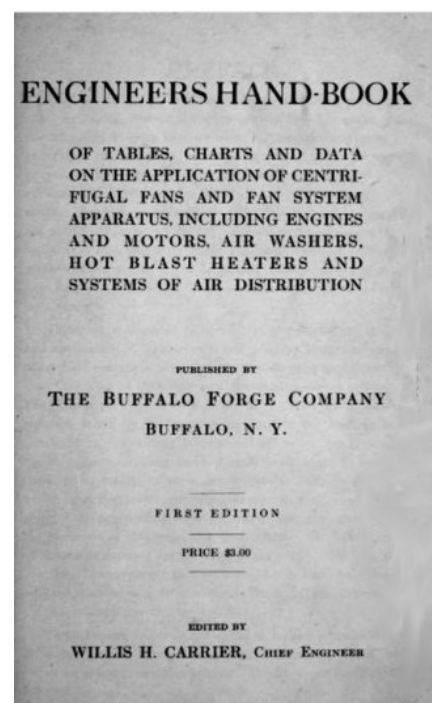
With the onset of World War I in late 1914, the Buffalo Forge Company, where Carrier had been employed for 12 years, decided to confine its activities entirely to manufacturing. The result was that seven young engineers pooled together their life savings of \$32,600 to form the Carrier Engineering Corporation in New York on June 26, 1915. The seven were Carrier, J. Irvine Lyle, Edward T. Murphy, L. Logan Lewis, Ernest T. Lyle, Frank Sanna, Alfred E. Stacey, Jr., and Edmund P. Heckel. The company eventually settled on Frelinghuysen Avenue in Newark, New Jersey.

Great Depression and afterwards

Despite the development of the centrifugal refrigeration machine and the commercial growth of air conditioning to cool buildings in the 1920s, the company ran into financial difficulties, as did many other companies, as a result of the Wall Street Crash in October 1929. In 1930, Carrier Engineering Corp. merged with Brunswick-Kroeschell Company and York Heating & Ventilating Corporation to form the Carrier Corporation, with Willis Carrier named chairman of the board.

The Great Depression slowed residential and commercial use of air conditioning. The company spread out over four cities in New Jersey and Pennsylvania until Carrier consolidated and moved his company to Syracuse, New York, in 1937. The company became one of the largest employers in central New York.

	Jennie Tifft Martin (m. 1913; died 1939)
	Elizabeth Marsh Wise (m. 1941)
Children	3
Awards	<u>ASME Medal</u> (1934) <u>Frank P. Brown Medal</u> (1941)



Engineers Hand-book, edited by Carrier while at the Buffalo Forge Co. in 1914

Willis Carrier's igloo-shaped pavilion^[10] in the 1939 New York World's Fair gave visitors a glimpse into the future of air conditioning, but before it became popular, World War II began. During the post-war economic boom of the 1950s, air conditioning began its tremendous growth in popularity. Today, air-conditioning and HVAC is a staple in many American homes and businesses.

Legacy

In 1930, Carrier started Toyo Carrier and Samsung Applications in Japan and Korea. South Korea is now the largest producer for air conditioning in the world. The Carrier Corporation pioneered the design and manufacture of refrigeration machines to cool large spaces. By increasing industrial production in the summer months, air conditioning revolutionized American life. The company became a subsidiary of United Technologies Corporation in 1980, and remained so until 2020, when it was spun off again as an independent publicly traded company.^[11] The Carrier Corporation remains a world leader in commercial and residential HVAC and refrigeration. In 2018, the Carrier Corporation had sales of \$18.6 billion and employed 53,000 people.

Personal life

Carrier met Edith Claire Seymour at Cornell and they married on August 29, 1902.^[12] Edith Claire Seymour died in 1912.^[13] He married Jennie Tifft Martin on April 16, 1913.^[14] She died in 1939.^[13] He married Elizabeth Marsh Wise of Terre Haute, Indiana on February 7, 1941.^[13] Carrier and all three of his wives are buried in Forest Lawn Cemetery in Buffalo, New York.^[15] Carrier fathered one child, Howard Carter Willis. He also adopted another two children^[16] from Jennie Martin, Vernon Gardner Carrier (1903–1985) and Earl Gardner Carrier (1905–1983).

Carrier was a Presbyterian.^[16]

Awards and recognition

For his contributions to science and industry, Willis Carrier was awarded an engineering degree by Lehigh University in 1935^[17] and an honorary Doctor of Letters degree by Alfred University in 1942; Carrier was awarded the Frank P. Brown Medal in 1942; and was inducted posthumously in the National Inventors Hall of Fame (1985) and the Buffalo Science Museum Hall of Fame (2008).

References

- Margaret Ingels, *Willis Haviland Carrier: father of air conditioning* (<http://www.google.gr/search?tbm=bks&hl=en&q=>), Country Life Press, 1952, p. 101: "Willis Haviland Carrier died in New York on October 7, 1950, shortly before his seventy-fourth birthday."
- "Commencements - Angola, June 20" (<https://www.newspapers.com/clip/75481153/commencements-angola-june-20-21-jun/>). *The Buffalo Weekly Express*. Buffalo, NY. June 21, 1894. p. 7. Retrieved April 10, 2021 – via Newspapers.com.
- "The High School Commencement" (<https://www.newspapers.com/clip/75482600/the-high-school-commencement-25-jun-189/>). *Buffalo Evening News*. June 25, 1897. p. 3. Retrieved April 10, 2021 – via Newspapers.com.
- "Cornell Scholarships" (<https://www.newspapers.com/clip/75379942/cornell-scholarships-2-oct-1897-buffal/>). *Buffalo Evening News*. October 2, 1897. p. 4 – via Newspapers.com.

- "Early Cornell Engineering Alumni Inventors" (<https://engineering.library.cornell.edu/early-cornell-engineering-alumni-inventors/>). *cornell.edu*. October 16, 2019. Retrieved April 8, 2021.
- Carlson, Jen (July 12, 2012). "Did You Know The First Air Conditioner Ever Was Installed In Brooklyn?" (<https://gothamist.com/arts-entertainment/did-you-know-the-first-air-conditioner-ever-was-installed-in-brooklyn>). Gothamist. Retrieved February 14, 2021.
- Marsh, Allison (2018). *The Factory: A Social History of Work and Technology* (<https://books.google.com/books?id=Z9B5DwAAQBAJ&pg=PA10>). ABC-CLIO. p. 10. ISBN 9781440853333. Retrieved August 16, 2021.
- Mingus, Nancy Blumenthal (2021). *Buffalo Business Pioneers* (<https://books.google.com/books?id=K-IJEAQAQBAJ&dq=%22Carrier+Air+Conditioning+Company+of+America%22+1908&pg=PA66>). p. 67. ISBN 9781467146685.
- Day, Ruby (July 1, 2019). "Air Conditioning" (<https://innowiki.org/air-conditioning/>). *Innowiki*. Retrieved July 1, 2019.
- The 1939 New York World's Fair (https://web.archive.org/web/20150417225126/http://www.1939nyworldsfair.com/worlds_fair/wf_tour/zone-5/carrier.htm)
- Cornell, Joe (April 6, 2020). "Raytheon Technologies, Otis And Carrier Begin Regular Way Trading" (<https://www.forbes.com/sites/joecornell/2020/04/06/raytheon-technologies-otis-and-carrier-begin-regular-way-trading>). *Forbes*. Retrieved April 8, 2021.
- "Home News" (<https://www.newspapers.com/clip/75380140/home-news-announcement-has-been-4/>). *Springville Journal*. Springville, NY. September 4, 1902. p. 5. Retrieved April 8, 2021 – via [Newspapers.com](https://www.newspapers.com/).
- "Elizabeth M. Wise Wedded to Willis H. Carrier" (<https://www.newspapers.com/clip/75380337/elizabeth-m-wise-wedded-to-willis-h-ca/>). *The Courier-News*. Bridgewater, NJ. February 13, 1941. p. 10. Retrieved April 8, 2021 – via [Newspapers.com](https://www.newspapers.com/).
- "Carrier-Martin" (<https://www.newspapers.com/clip/75392504/carrier-martin-21-apr-1913-buffalo/>). *Buffalo Evening News*. April 21, 1913. p. 8. Retrieved April 8, 2021 – via [Newspapers.com](https://www.newspapers.com/).
- Ingels, Margaret (1952), *Willis Haviland Carrier: Father of Air Conditioning*, Garden City: Country Life Press.
- Ivins, Molly (1999). *Willis Carrier* (<https://books.google.com/books?id=wO3qIZr7s3MC&pg=PA64>). *Time/CBS News "People of the Century"*. Simon and Schuster. p. 64. ISBN 978-0-684-87093-9. Retrieved May 19, 2020. "Willis Carrier, who read and sought out knowledge until his death at 73, married three times (twice a widower) and adopted two children, neither of whom survive. In classic American-businessman fashion, he was a Presbyterian, a Republican and a golfer."
- Cornelius, Billy (1946), *The Lehigh Story* (<http://digital.lib.lehigh.edu/eb/supp/1414/index.pdf>) (PDF), Bethlehem: Self Published, p. 95.

External links

- Rational Psychrometric Formulae, by Willis H. Carrier (1911)
- Carrier's Role in Automotive Air Conditioning (<http://www.nyc.net.au/node/149398>) Archived (<https://web.archive.org/web/20160111133623/http://www.nyc.net.au/node/149398>) January 11, 2016, at the [Wayback Machine](https://www.waybackmachine.org/)

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