

# GEORGE FRICK

*By EurIng Brian Roberts, CIBSE Heritage Group*



**A O Frick, son of George Frick**

George Frick (1826-1892), a young millwright, began building steam engines in the early 1850's near Waynesboro, Pennsylvania. By 1856, he was producing large numbers of engines. By the 1870's, Frick had gained an international reputation, so when a Baltimore engineer wanted to convert a steam engine into an ammonia compressor he turned to Frick. The work was completed in 1882. The following year a complete two-cylinder steam-driven refrigerating machine was built based largely on the designs of A O Frick, one of the sons of the founder.

Then Edgar Penny joined the Frick Company from the Corliss Steam Engine Works and helped develop the Frick open-type steam-driven refrigerating machine which was to become a standard in the industry until early in World War I. In 1888, the Frick Company erected a 100 ton ice-making plant in New Orleans. This made raw water ice by the plate system.

It has been said “The genius of George Frick was the guiding spirit in the development of the Frick Company from its establishment in 1853 until the death of (George) the founder in 1892).

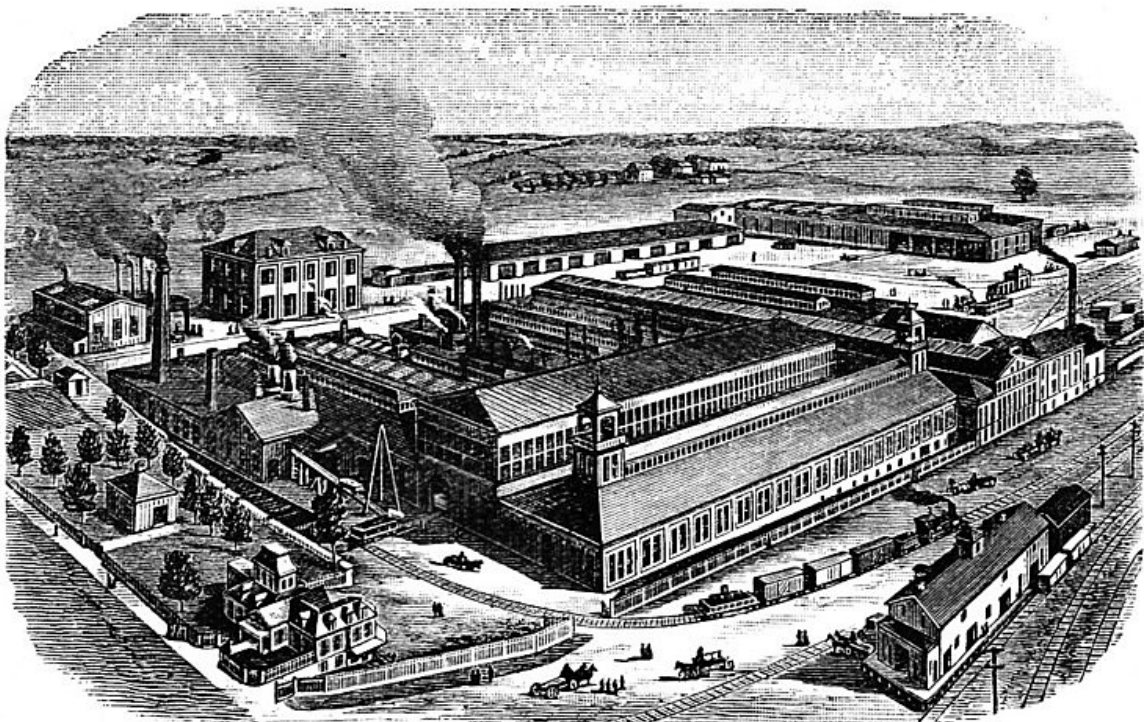
In 1894, Frick installed a complete 125 ton ice-making system for the East St Louis Ice & Cold Storage Company in a plant which included 300,000 square feet of cold storage space. (This work claimed to represent the largest sum ever invested in an ice-making and refrigerating plant up to that time). Two vertical compressors, each with a 36-inch stroke, were installed, each driven by a compound condensing engine, while a third machine supplied power for the auxiliaries.

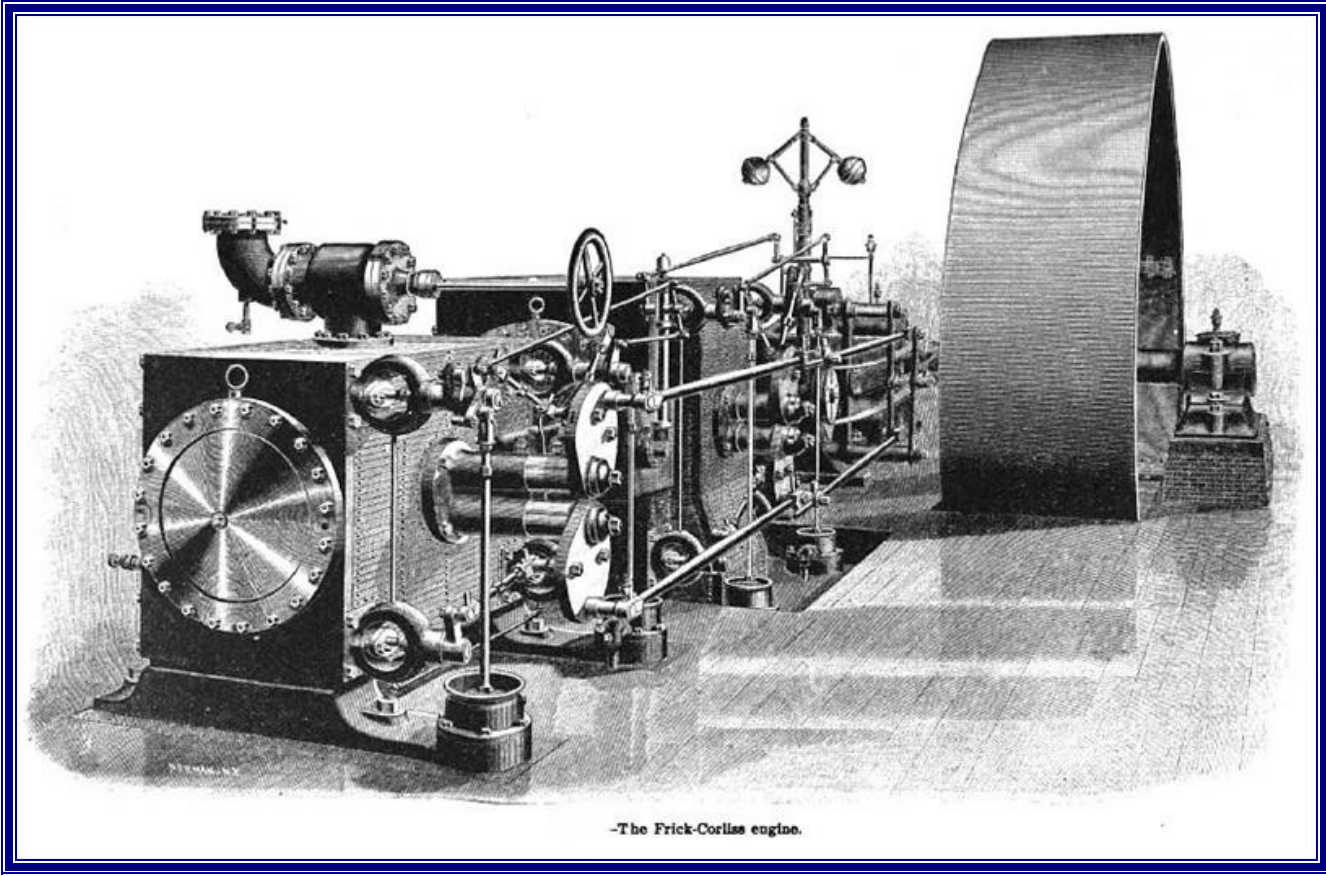
Possibly, the largest Frick machine ever built was that supplied to the Armour meat-packing plant in Kansas City in 1896. It was described as a gigantic tandem-compound steam-engine-driven compressor with ammonia cylinders of 27-inches bore by 48-inches stroke.

In 1897, Frick installed the first “group lift ice plant” in St Louis. Thirteen cans –every other one in a row of 26- were handled at a time, each can being connected to an I-beam suspended from an electric crane by two chains with hooks.

In 1904, A O Frick became President of the company, later serving as Chairman. Ezra Frick was made President in 1924.

## Frick Company's Workshops.





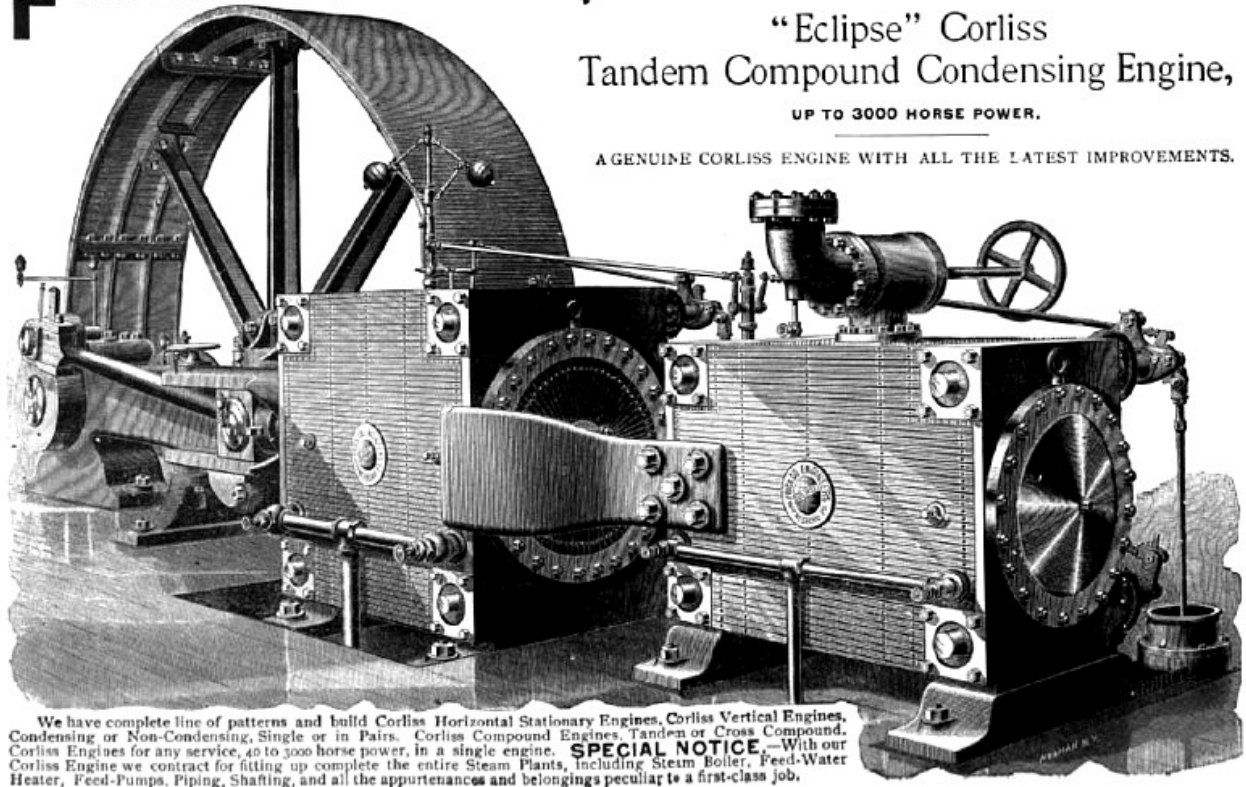
-The Frick-Corliss engine.

**FRICK COMPANY, ENGINEERS, Waynesboro, Franklin Co., Pa.**

“Eclipse” Corliss  
Tandem Compound Condensing Engine,

UP TO 3000 HORSE POWER.

A GENUINE CORLISS ENGINE WITH ALL THE LATEST IMPROVEMENTS.

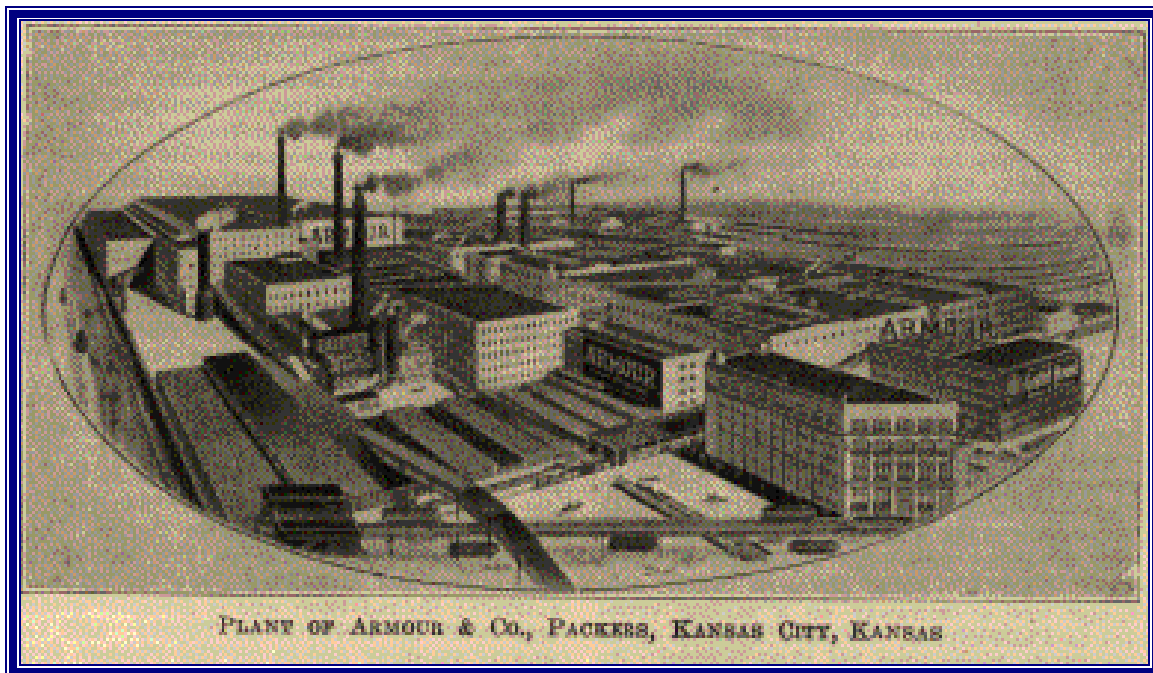


We have complete line of patterns and build Corliss Horizontal Stationary Engines, Corliss Vertical Engines, Condensing or Non-Condensing, Single or in Pairs. Corliss Compound Engines, Tandem or Cross Compound. Corliss Engines for any service, 40 to 3000 horse power, in a single engine. **SPECIAL NOTICE.**—With our Corliss Engine we contract for fitting up complete the entire Steam Plants, including Steam Boiler, Feed-Water Heater, Feed-Pumps, Piping, Shafting, and all the appurtenances and belongings peculiar to a first-class job.

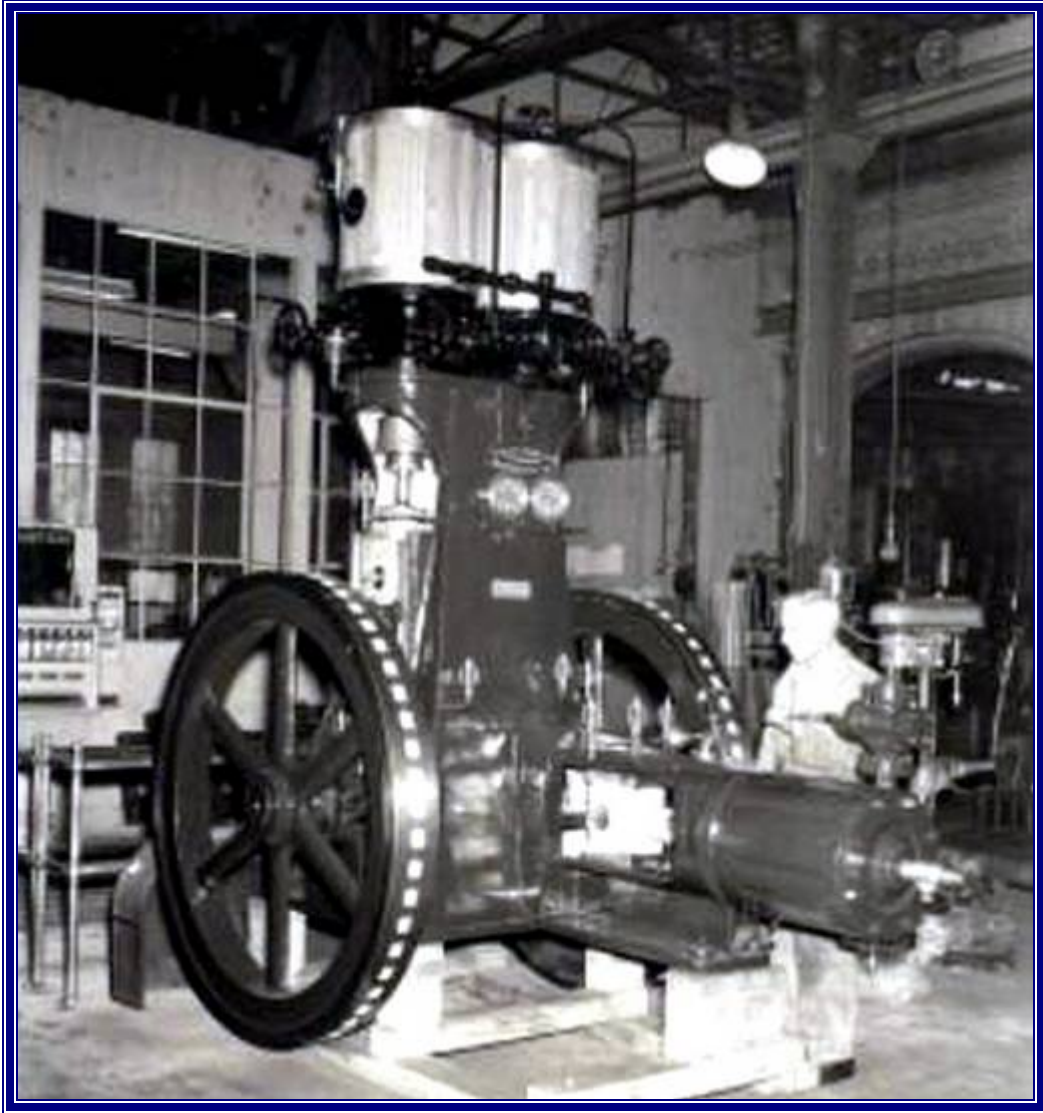
Early Frick Company advertisements featuring Corliss engines



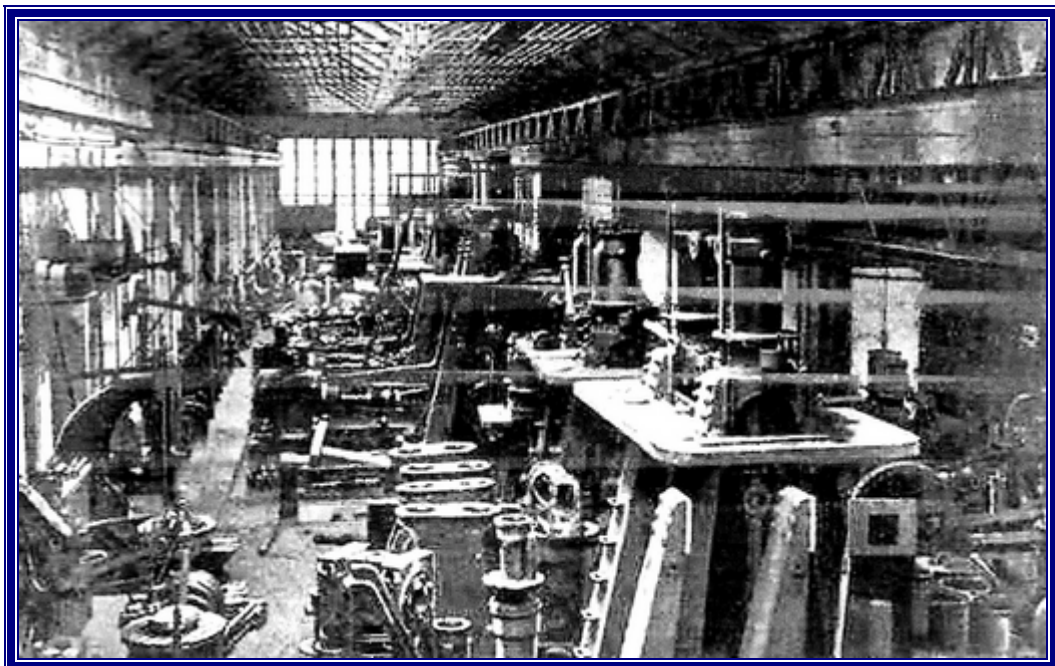
The present day St Louis Ice & Cold Storage Company where Frick installed refrigeration in 1894



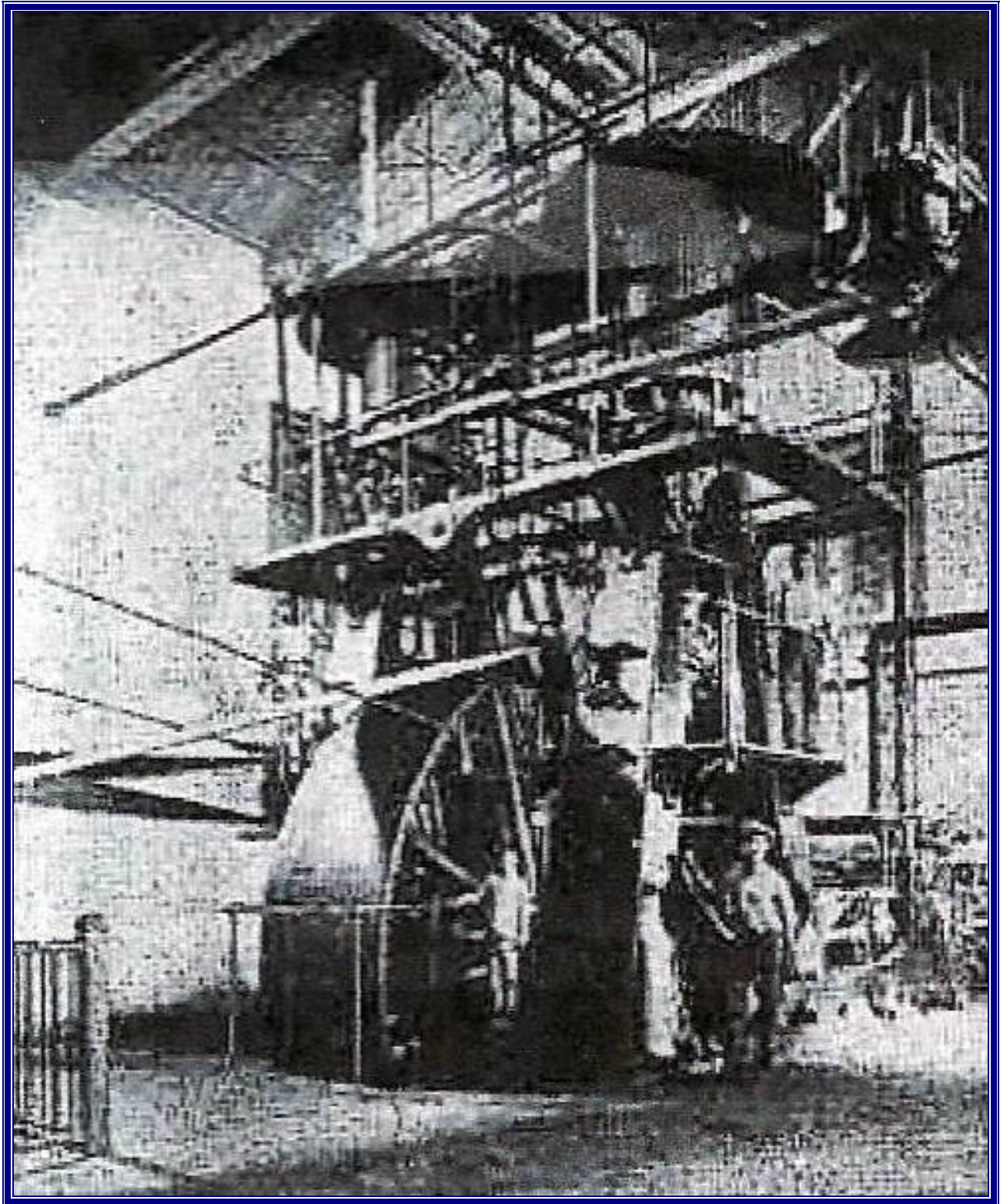
Armour & Company of Kansas City, where Frick installed refrigeration in 1896



Frick machinery



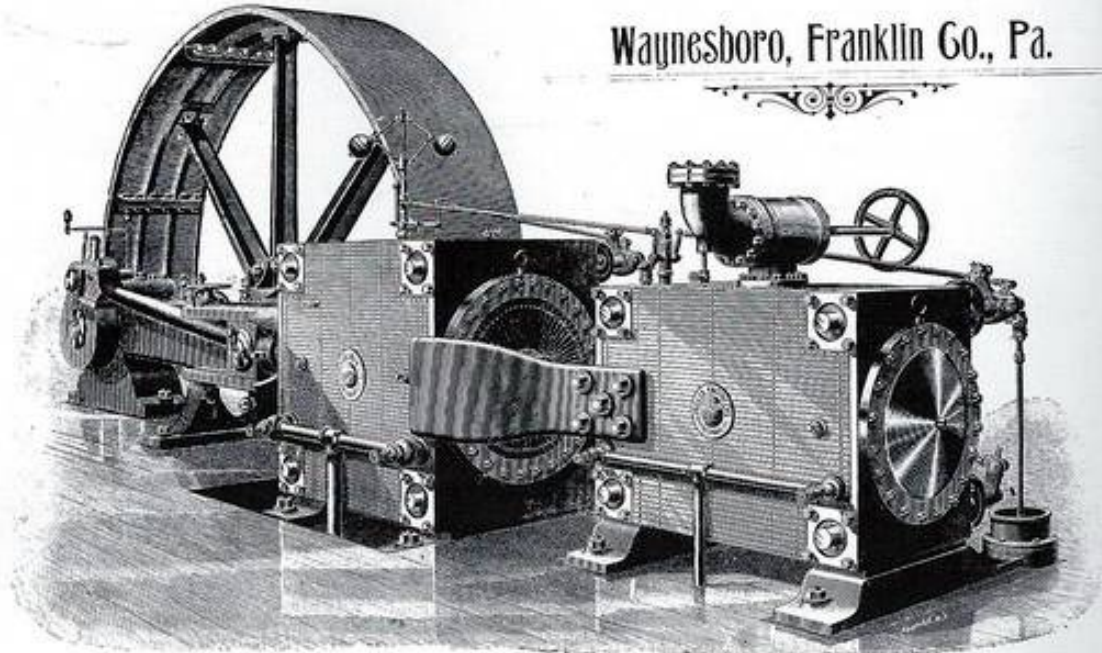
Assembly of Frick compressors at Waynesboro Factory, 1900



An 1892 installation: Frick Machine (17-inches bore by 36-inches stroke) in operation at La Tropical Brewery in Havana, arranged for either steam engine or water wheel drive

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Waynesboro, Franklin Co., Pa.



A GENUINE CORLISS ENGINE WITH ALL THE LATEST IMPROVEMENTS.

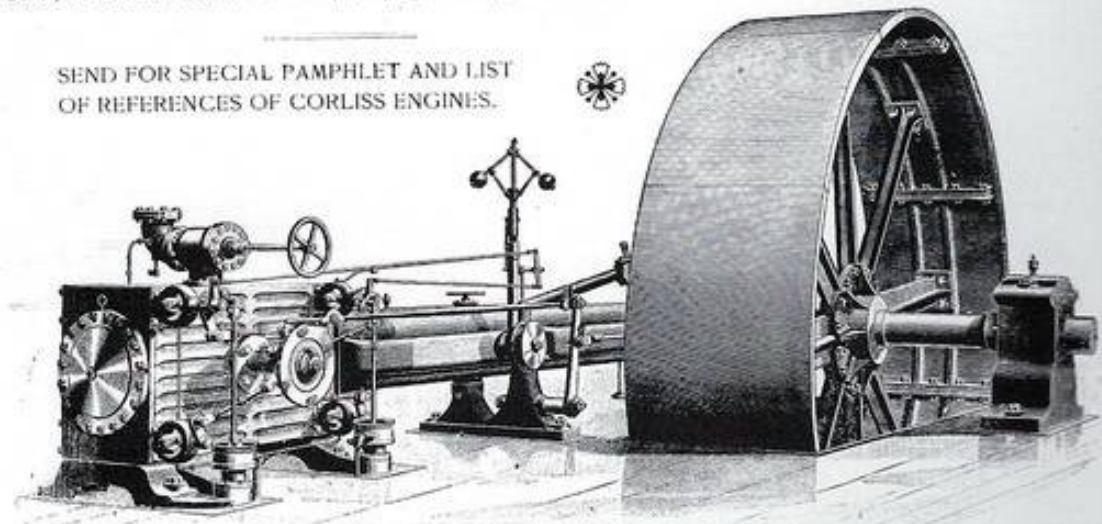
## “ECLIPSE” CORLISS TANDEM COMPOUND CONDENSING ENGINE

UP TO 3000 HORSE POWER

We have complete line of patterns and build Corliss Horizontal Stationary Engines, Corliss Vertical Engines, Condensing or Non-Condensing, Single or in Pairs. Corliss Compound Engines, Tandem or Cross Compound. Corliss Engines for any service, 40 to 3000-horse power, in a single engine.

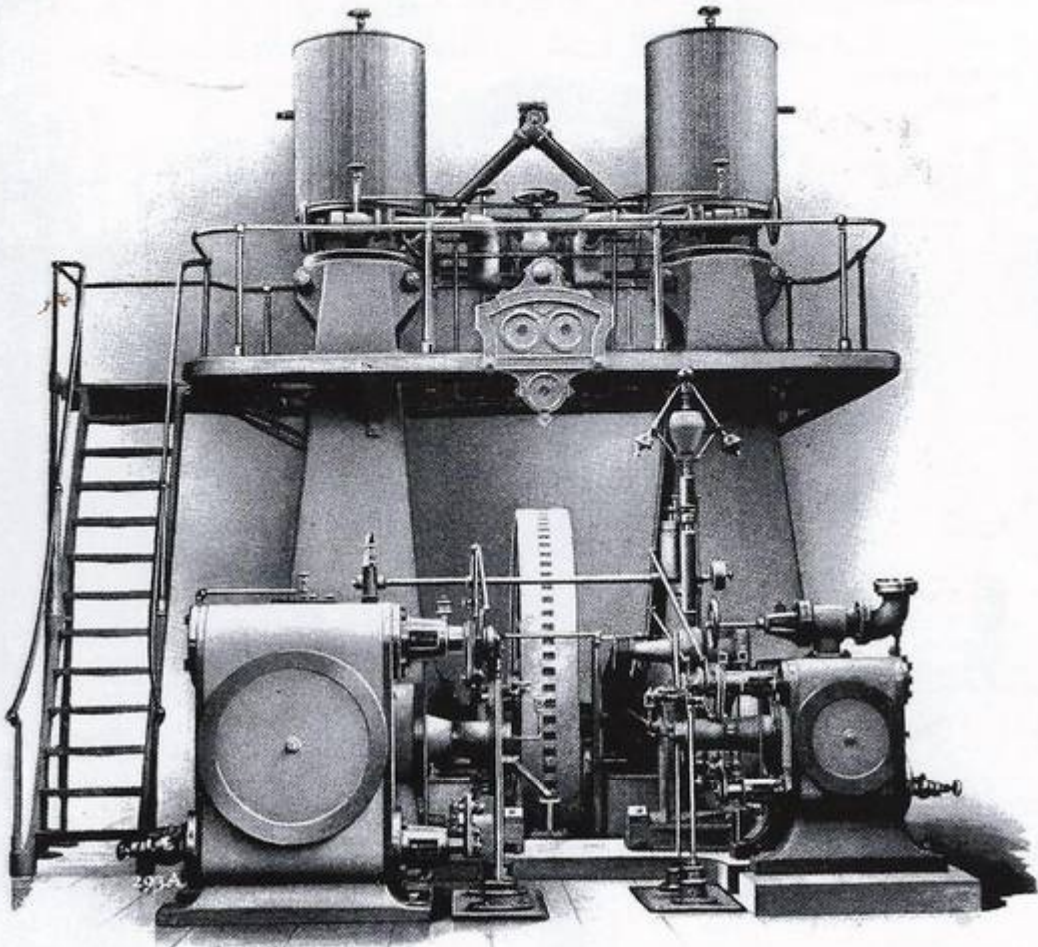
SPECIAL NOTICE—With our Corliss Engine we contract for fitting up complete the entire Steam Plants, including Steam Boilers, Feed Water Heaters, Feed Pumps, Piping, Shafing, and all the appurtenances and belongings peculiar to a first-class job.

SEND FOR SPECIAL PAMPHLET AND LIST  
OF REFERENCES OF CORLISS ENGINES.



1000 HORSE POWER “ECLIPSE” PLAIN CORLISS ENGINE.

THE WORLD'S STANDARD



**FRICK COMPANY**  
WAYNESBORO, PA., U. S. A.

SOLE BUILDERS OF THE

**ECLIPSE MACHINES**  
FOR ICE MAKING AND REFRIGERATING USE

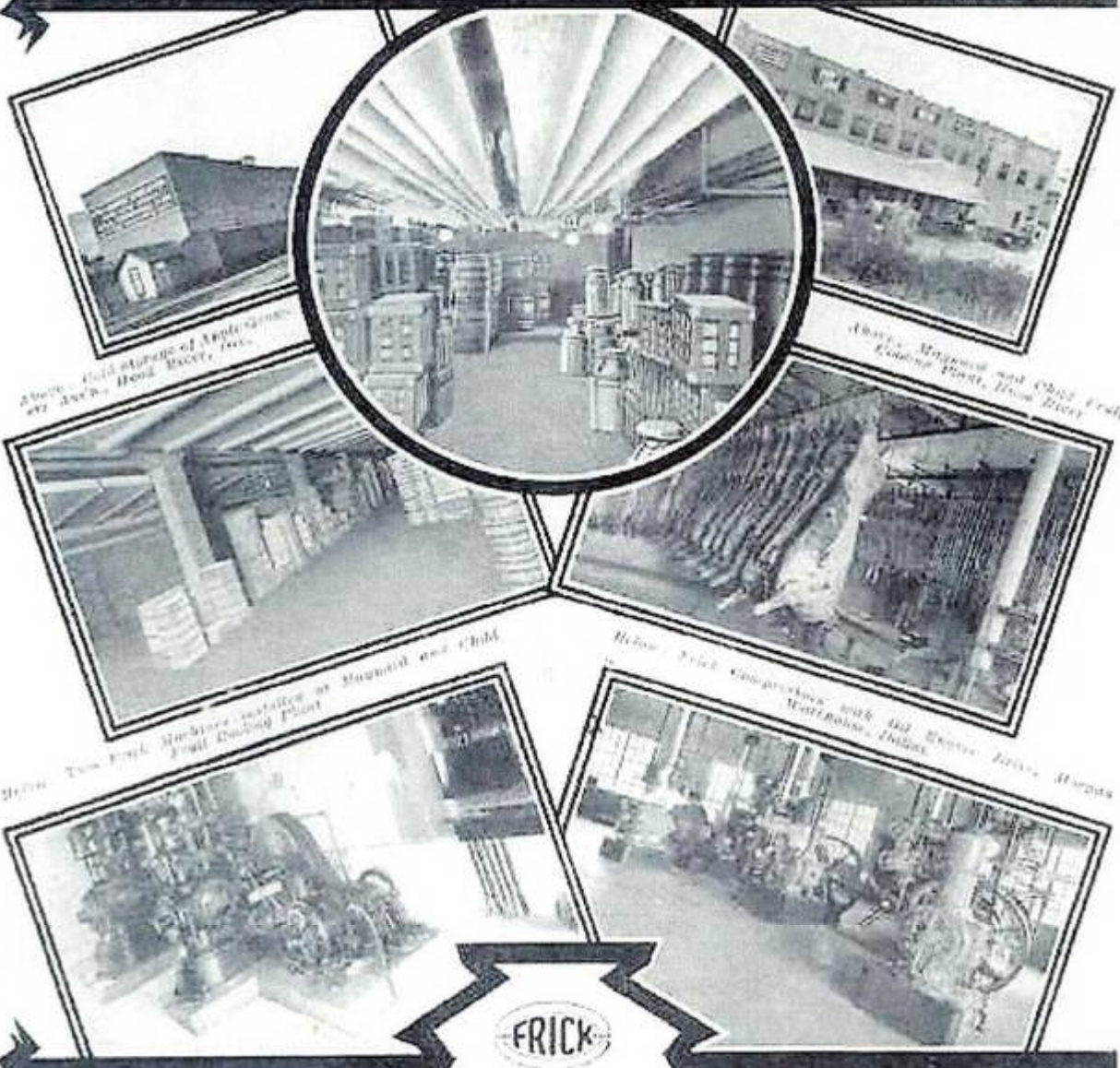
Get Our Estimate for New Equipment or for Improving of Present Plant

**COMPLETE OUTFITS<sup>FR</sup> FOR REFRIGERATION  
AND ICE MANUFACTURE**

Our Red Book and List of Users Mailed Free on Application



# FRICK REFRIGERATION



Above - Cold Storage of Apple Cakes at Dr. A. S. Hood, Everett, Wash.

Above - Warehouse and Cold Storage at General Electric, West Pitts., Ohio

Below - Two Frick Machines installed at Municipal Ice Plant

Below - Frick Compressor with 400 Horse Power at Municipal Ice Plant



The continued recognition given to Frick Refrigerating Equipment by Owners and Engineers is the surest testimony of its lasting value. This holds true in cold storages as well as in ice plants, hotels and other places where first-class machinery is in demand.

Ask any engineer what he thinks of Frick compressors; consult with plant managers as to the overall results obtained with Frick cooling systems; visit some of the successful cold storages that have depended on Frick Refrigeration for generations. The facts will speak for themselves.

New York, N. Y.  
Syracuse, N. Y.  
Pittsburgh, Pa.  
Cincinnati, Ohio



Philadelphia, Pa.  
Baltimore, Md.  
Charlotte, N. C.

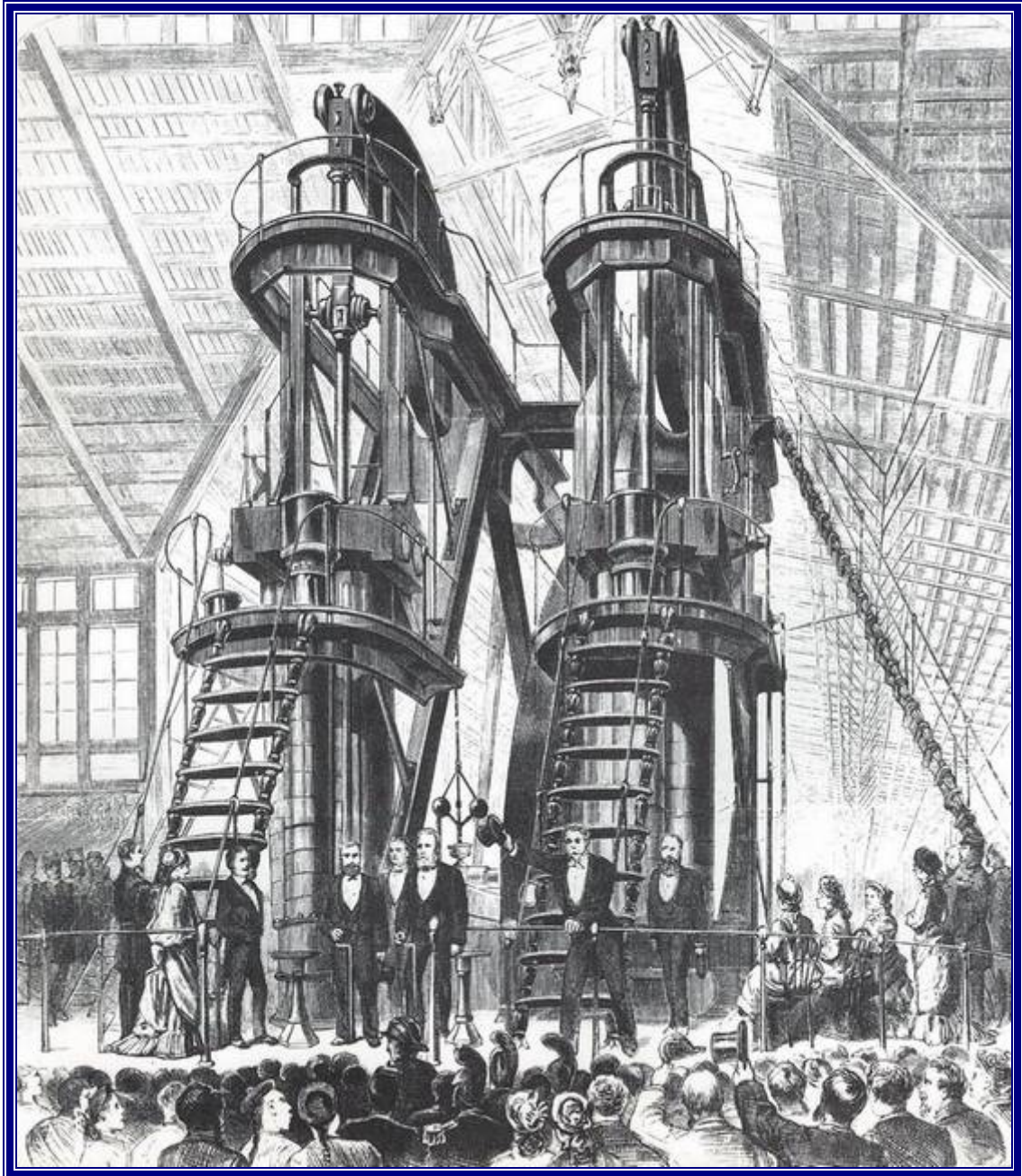
## **Appendix: Corliss Engines**

The Corliss steam engine was patented in 1849, invented and named after the American engineer George Henry Corliss of Providence, Rhode Island, being fitted with rotary valves and variable valve timing. This Corliss valve gear offered the best thermal efficiency of any type of steam engine until 20<sup>th</sup> century improvements in engine design and the introduction of the steam turbine. Corliss engines were about 30% more fuel efficient than conventional steam engines of the time (making steam power more economical than water power).

Corliss engines were used to provide mechanical power to mills and factories and to drive dynamos for electricity generation. They were adopted by a number of refrigeration manufacturers to drive compressor systems. Many Corliss machines were huge, standing many feet tall and developing several hundred horsepower, though working at low speed (typically 100 revolutions per minute), while turning massive flywheels weighing several tons.



**George Henry Corliss, 1817-1888**



**Giant Corliss engine in the Machinery Hall, Philadelphia Exposition, 1876**

## **References**

*What the Refrigerating Machine Companies have Contributed*, Refrigerating Engineering, December, 1934

*The Great Exhibitions*, John Allwood, Studio Vista, London, 1977

*Heat & Cold: Mastering the Great Indoors*, Barry Donaldson & Bernard Nagengast, ASHRAE, 1994

*Ice and Refrigeration*, Centennial Booklet, Bern Nagengast, ASHRAE, 2005