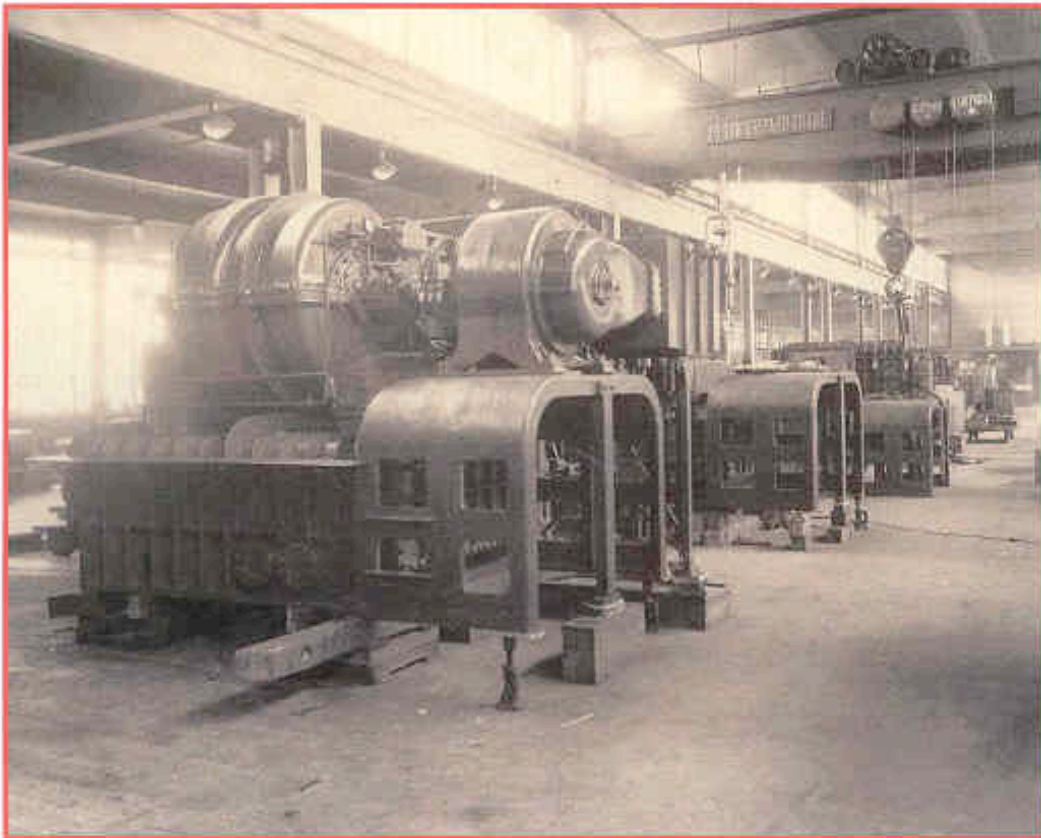


# *Willis Haviland Carrier*

## *Father of Air Conditioning*

**VOLUME-1**  
**Willis H Carrier: The Man and His Message**



*1.7 The Drive for Production:  
Carrier Keeps His Head Down*

## CARRIER THE MAN AND HIS MESSAGE

### CHAPTER SEVEN

#### Carrier Keeps his Head Down

Both the self contained air conditioning unit and the weather - master system are very pertinent illustrations of the ability of Carrier to pursue an idea relentlessly over years until he was satisfied that the engineering production/manufacture/application had been achieved to his sense of perfection.

The self contained air conditioning unit had been an idea prior to the merger, which only continued the development already commenced for a Room Cooler. Eventually this first development was marketed in 1932 as the Atmospheric Cabinet but succeeded only as a step towards the ultimate requirement. After a few more years of trial and error, the so called portable units had been tested by field engineers in India, South America and the Far East and the Corporation started to gear itself for mass production! There was quite a slice of the Corporation that had taken to heart the alleged criticism by a firm of industrial consultants that Carrier Engineering over-engineered its contracts. They wanted to get into the manufacture and marketing business which became interpreted as "cut out the frills". The Corporation even tried to do the right thing by this pressure in hiring as a top executive the man who had put Easy Kleen Washing machines into the volume market. The attempt had big teething troubles and reinforced an original conception that the unit air conditioning market was only in an early growth and needed careful handling. Over the next five years the check on the basic necessities of

the unit to achieve desirable results on a wide market, domestic and export developed into a sequence rationalisation after thorough investigation of all territorial experiences. This resulted in a healthy anticipation of market requirements and accumulated judgment on the production load factors.

But before that success, there were plenty of skirmishes in the long battle as the domestic market reacted to the need for distributors and agents while existing Engineering Contracting organisations were tempted to repel boarders on the grounds of loss of prestige and as the field engineers in the international field were pungent in their criticism of the overseas territories being used as a dump for unsold domestic units. It was the classic battle between design engineering and sales marketing finally resolved when both recognised the part the other played in the overall strategy. During this time, heads rose and fell especially during the early skirmishes when the lines of battle were so loosely drawn. New names appeared in the articulate hierarchy, new personalities appeared without the Carrier halo and were thereby on trial.

The Chief seems to have kept his head well down - he was never sited on one side or the other. To him, the basic requirements for the self contained units were defined and were technically achievable whereas the Weathermaster System for office air conditioning was presenting him with problems the unravelling of which was his whole life. First, the Weathermaster unit had to be devised, based essentially on the original ejector nozzle by Dr. Klein of Stuttgart and linked up to an air supply system. By 1934 there were twenty three buildings using Weathermasters. Then Carrier concentrated on the reduction of the size of air

risers. Space was expensive in these multi-storeyed buildings. He returned to his idea of the twenties, the use of high velocity air. But high velocity meant high pressure and thus the need for air-tight ducts. The answer was the conduit design and the mosaic of the Carrier High Velocity Weathermaster System was patented and a year later the new design had been completed. The Chief was now 62 years old and the triumph of the Weathermaster design was the result of nearly twenty years dedication to a single idea. The application of the Weathermaster System to many buildings in the States was not spread into the International field because of the advent of the second World War but in the sixties it was to have widespread application to the new phase of office buildings in all the major cities of the world.

In the meantime, there had been a considerable number of engineering developments in the field of refrigeration notably in the use of "Freon-12". Carrier had already appreciated that this refrigerant could be the solution to the problem of providing a safe small capacity refrigerating unit but from his discussions with Dr. Thomas Midgley Jr. (whose paper "Organic Fluorides as Refrigerants" had given rise to the interest) Carrier believed that the gas would be an ideal refrigerant for centrifugal compression. Based on data supplied, photostat copies of hand written notes, and a sample of the fluid (trichloromonofluoromethane  $\text{CCl}_3\text{F}$ ) experimental laboratory tests convinced Carrier that the substance had none of the disadvantages of either dielene or Carrene 1 and promised the distinct commercial advantage through greater compression of reducing the number of stages and therefore cost of the centri-

fugal compressors. Carrier decided to go ahead and re - design the machine to be manufactured in America but the pattern drawings were made by the Jaeger firm in Germany with whom the earlier cooperation had been so successful. A completely new line of compressor resulted and into them refinements in surface tubes for the evaporators and condensers had been incorporated.

In 1934, Dr. Carrier was awarded the A.S.M.E. Gold Medal. A year later, Doctor of Engineering was conferred on him by Lehigh Engineering and in that same year, 1935, he was awarded the Frank P. Brown medal by the Franklin Institute of Philadelphia.

The American Society of Heating Refrigeration and Air Conditioning Engineers, A.S.H.R.A.E., in their article "Air Conditioning and Dr. Carrier" in the July 1976 journal printed a letter dated 25th January, 1932, from Carrier to the A.S.H.V.E. sending \$1000 as a gift for research, his fundamental faith.

This decade 1930-1940 might be described as the period of fulfilment when the early inventiveness and maturity of design development resulted in world wide acceptance, coupled with the Corporation's new capability for production in quantity of all the major components for any air conditioning installation. The application of Carrier's ideas were being experienced by travellers on many steam

ship lines, on trains in many countries, in public places of entertainment, in industries, in office buildings and in domestic homes. No one had seen so wide an influence on human environment during such a decade as Carrier had seen resulting from his original ideas. Yet his attitude was always that of the engineer. He was content to allow others to administer the corporation and he had complete trust in his friend and partner, the President of the Corporation, J. Irvine Lyle. While others might have sought recognition, even demanded it, the Chief kept his head down, avoided publicity and concentrated on solving his engineering problems. Only once did he interfere on the commercial level at a time when there was talk on a take-over by a prominent and large organisation. It would have made Carrier into a wealthy man but both he and Lyle were conscious of the fact that the team that had grown up with them would not benefit so much and their concern made them decide to continue as they were, bearing the responsibilities and liabilities of a fast growing organisation at a time when most men are thinking of retirement.

In 1939, the Chief's second wife died. He later married again, his third wife was Elizabeth Wise.

Dr. Carrier was on the Board of the Syracuse Y.M.C.S., served as Chairman of one of the Syracuse Selective Service Boards and participated in professional and social organisations in Syracuse and New York City.

He was elected Alumni Trustee of Cornell University and in 1940, he was President of Cornell Society of Engineers. From his inauguration I choose the following quote: "As a result of his labours, a new source of wealth, employment and prosperity was brought to U.S.A. It is fair to say that hundreds of thousands of men <sup>and</sup> ~~and~~ women gain a livelihood as a result of his work."