



**GRIFFIN WHEEL COMPANY**  
**FIRST HUNDRED YEARS**  
**1877-1977**

## CONTENTS

Dedication	1
Griffin Organization	2
Chilled Iron Wheel Story	8
Cast Steel Wheel Introduction	29
Brass Foundry – Tacoma, Washington	41
Anchor Brake Shoes	42
Miscellaneous Castings	43
Wheel Mounting Facilities	46
Griffin Wheel Company Employees	54
Griffin Steel Foundries Ltd Employees	68
Griffin Wheel Company – Active Retirees	73
Griffin Steel Foundries Ltd Active Retirees	75
Milestones	76

HISTORY OF THE  
GRIFFIN WHEEL COMPANY  
1877-1977

The Griffin Wheel Company is celebrating its 100th anniversary in 1977. During these 100 years, the company has grown from a small, family run operation to the world's largest producer of railroad wheels. Griffin's success is the result of thousands of men and women working together to make the best product possible. This book cites highlights and accomplishments in the company's history since Thomas F. Griffin founded it in 1877.

## **GRIFFIN FAMILY BACKGROUND**

Thomas F. Griffin was born in Limerick County, Ireland on December 18, 1826, four years before Peter Cooper built the famous experimental locomotive "Tom Thumb." At the age of 8, a year after his father died, young Thomas came to the United States with friends and was raised in Rochester, New York. In 1850, he was named foreman of Rochester's William Kidd and Company railroad wheel foundry. The firm's owners quickly spotted his ability and aggressiveness and set up an agreement with him to supervise the foundry and provide all of the manual labor for \$1.20 per wheel. Griffin worked for Kidd and Company from 1850 until 1873, during which time production increased from 18 to 50 wheels a day, a large number for that time.

Railroad travel was growing at a feverish pace during the second half of the 1800's. The Civil War and discovery of gold in California were major factors in the rush to build tracks across the country. Between 1850 and 1890 railroad track mileage increased from 9,000 to 164,000. Thomas F. Griffin was in the right field at the right time to participate in the railroad boom.

Although Griffin successfully managed the Rochester wheel foundry for 23 years, greater accomplishments would come a few years later when he and his sons would go into business for themselves.

Griffin's sons, Thomas Augustus and Patrick Henry, both got their first taste of the railroad wheel industry by working in their father's Rochester foundry. Thomas, the eldest, started as a 16-year-old apprentice and soon advanced to core maker, cupola charger, melter, operator, molder's helper and finally, master wheel molder. Patrick also completed the apprenticeship program and became an experienced wheelmaker.

When fire destroyed the Detroit Car Wheel Company in 1873 Thomas F. Griffin went to Detroit to see about supplying wheels while the plant was being rebuilt. Instead he was induced to stay and operate the renovated plant. So the Griffins moved to Detroit and continued to manufacture wheels.

Griffin's contract to manage the Detroit Foundry was dissolved after four years because the owners felt it was too advantageous to him financially and he was making too much money. This happening and the continued growth of the railroad industry sparked Griffin and his sons to start their own company.

## **COMPANY ORGANIZATION**

The Griffin Car Wheel Company was organized on April 19, 1877 with \$18,000 in capital and lots of high hopes. Thomas F. Griffin was president; Thomas A., treasurer; Patrick H., secretary; and a family friend, Dr. David O. Farrand, vice president. Their hard work and determination resulted in 1,025 wheels being manufactured that first year with the initial shipment of 100 wheels going to the Michigan Central Railway.

The company was officially organized under Michigan law on October 5, 1877 "for the purpose of manufacturing, constructing and building car wheels and all property, articles and machinery of iron, wood, steel, or other metals or materials alone or in combination . . ."

## EARLY FOUNDRY CONDITIONS

It took a rugged person to work in the Griffin Foundry. Molten iron and hot wheels were conveyed on push carts, while jib cranes on the molding floors and pits were operated by hand wires. Sometimes the dust from the molding sand got so thick that workers couldn't see from one end of the plant to the other. Despite the difficult working conditions, the Griffin Car Wheel Company was a financial success.

Thomas A. Griffin, newly married and anxious to make a name for himself, was the first to leave Detroit. He moved to Chicago, which had become the major railroad city of the Midwest. Griffin quickly interested the firm of Wells and French to associate with him, and on February 21, 1881 he organized Griffin and Wells. The plant was located on Paulina Street, just south of Blue Island, and its output was 25 wheels a day.

Shortly later, Patrick was sent back east to operate plants in Buffalo, New York and St. Thomas, Ontario. These rapid expansion moves were united in 1885 by a holding company called Thomas F. Griffin and Sons. The holding company was dissolved after a year and a half, at which time Thomas F. retained full control of the shop in Detroit; Patrick became owner of the plants in Buffalo and St. Thomas; and Thomas A. controlled the Chicago foundry.

Also at this time, Thomas A. Griffin, then 33, foresaw an almost unlimited market for car wheels and he began planning to expand his operations. He had begun to make use of the years of wheel producing knowledge he had acquired from his father. The result would be the country's largest railroad car wheel company.

## **GRIFFIN WHEEL FOUNDRY COMPANY**

The first move Thomas A. made to organize the Griffin Wheel Foundry Company was on December 12, 1885 with himself as president and treasurer. The rented plant, located on Roby Street near Blue Island, turned out 160 wheels a day in 1886, but by 1890 the output was 250.

## **CHICAGO, ILLINOIS**

The Chicago census of 1890 numbered 1,099,850 citizens. Seventy-five per cent of its residents were foreign born or children of foreign born like Thomas A. Griffin. Skyscrapers were going up as the city was being wired for telephones and electricity. Construction of the elevated railroad (first steam then electric) was begun and would soon curve around downtown to form the Chicago "Loop." The Gay Nineties were exciting times in Chicago and America. The country was growing and prospering.

Thomas A. Griffin's foundry was a part of that rapid growth. By 1890 production was taxing the facilities, yet the railroads kept demanding more wheels. A new \$700,000 building took care of that problem. Situated on Sacramento Avenue, and called Sacramento Square, the plant started with a daily output of 300 wheels a day and was increased to 700 four years later.

The new building contained 38 circular floors of 25 molds each, a 90 inch cupola, and two circular groups of annealing pits 8½ feet deep. About two years after the plant opened the hand cranes were converted to air hoists. These were the first power cranes on circular molding floors. Another special feature was over head tracks for conveying molten iron and hot wheels.

## **GRIFFIN WHEEL COMPANY**

With business increasing so rapidly, Griffin found it necessary to reorganize on a larger scale. On January 6, 1894 the firm's name was shortened to its present title, "Griffin Wheel Company," and formed as an Illinois corporation with capital stock of \$1 million.

Although the Griffins were major figures in the manufacturing of railroad wheels, they cannot take credit for inventing them. That discovery occurred about 60 years before the Griffin Car Wheel Company was formed.

## THE CHILLED CAR WHEEL

Railroad wheels today are made of steel, but until the 1940's they were made of iron or, more exactly, chilled iron. Chilled iron wheels were a combination of two types of iron – hard white iron and soft grey iron. Chilled iron is based on the principle that when molten iron cools quickly the graphite or carbon forms carbides of iron. Iron containing carbides is wear-resistant and whitish in color. When iron cools more slowly the graphite or carbon remains in the free state with the result that the metal is ductile, machinable and gray in appearance.

Wheelmakers took advantage of these two traits of metal by making the parts of the wheel which were on the rail – the flange and tread – very hard and by making the center of the wheel, which had to be machined, tough but softer. This was accomplished by placing a heavy circular casting in the wheel mold. The metal around the casting cooled quickly and formed the tread and flange. The rest of the mold was made of sand, which permitted the metal to cool more slowly and form the softer iron.

The history of chilled iron railroad wheels dates back to 1818 when George Stephenson (the steam locomotive developer) and his associates tested them on one of the early steam engines in England. Eleven years later, the first chilled iron wheels were manufactured in America at a foundry in Maryland and used on a railroad that hauled coal from the mines. The peak year for the manufacture of chilled car wheels was 1943 when 3,306,463 were made. The best year for Griffin was 1923 with 1,522,077.

The diameter as well as the exact tread and flange contour of freight car wheels was defined in 1868 by the Master Car Builders Association, the predecessor of the Association of American Railroads. The diameter, 33 inches, was dictated by the fact that this was the largest diameter the early English foundries could cast.

The chilled iron process and 33 inch diameter car wheels remained the same for many years, but wheel designs changed. Griffin Wheel was one of the most active companies in developing new designs and seeking patents for its ideas. From 1838 until 1928 the standard railroad car wheel design was the double plated wheel. It had parallel plates which extended from the hub to the rim with a hollow space between the plates. Griffin's double plate wheel, named the F.C.S. Wheel, was patented in 1911. The American Railway Association adopted it as the standard of the industry for several size freight cars. The single plate wheel was adopted as the AAR standard in 1928 as it was stronger than the double plate wheel resulting in fewer cracked plates and broken wheels. The Griffin single plate wheel was patented in 1924.

## **EXPANSION**

The Griffin Wheel Company owned and operated just one plant in early 1894 – Sacramento Square with a capacity of 700 wheels per day. But things were not about to stay that way for long. Thomas A. Griffin saw a need to establish foundries at growing railroad centers, and his first venture was to build a plant in Overland, Colorado, then a suburb of Denver.

## **DENVER, COLORADO PLANT**

The plant began operations in November, 1895 with an output of about 50 wheels per day. The facility was built on the side of a hill so that coke and iron could be loaded into the cupolas without using an elevator.

## **ST. PAUL, MINNESOTA PLANT**

In the same year the Northwestern Wheel and Foundry Company of St. Paul was purchased for \$86,000. The facility was rebuilt to allow for output of about 150 wheels.

In the meantime, the Detroit plant had continued to operate as a separate organization with Thomas F. Griffin as president and Thomas A. as vice president. On January 1, 1896 the Detroit operations were purchased by the Griffin Wheel Company for a payment of \$250,000 in stock.

## **THOMAS F. GRIFFIN 1826-1907**

The elder Griffin was made vice president of his son's company, but the active management of the Detroit foundry was taken over by a younger person. Thomas F. Griffin, the grand patriarch of the car wheel industry, died on February 11, 1907 at the age of 80.

## **BOSTON, MASSACHUSETTS PLANT**

Son Patrick ran into financial difficulties out East so his brother purchased his interest in the Boston Car Wheel Company on December 30, 1901. That firm formally joined the Griffin Wheel Company in 1903 for \$290,000. Improvements were made to the plant and the capacity increased to 150 wheels, many of which were used for street car service.

## **TACOMA, KANSAS CITY AND FT. MADISON**

Plants in three other cities were purchased by the rapidly growing company between 1897 and 1901. The American Foundry Company of Tacoma, Washington was bought for \$50,000, and had an original output of 25 wheels daily. The Kansas City Car and Foundry Plant cost \$345,000, and had a capacity of 175 wheels. A plant in Fort Madison, Iowa was purchased for \$200,000 to obtain the business of the Santa Fe Railroad. It operated for a year, then was shut down and dismantled.

Thus by 1904 the Griffin Wheel Company had wheel producing plants in seven cities (not counting Fort Madison), and it was manufacturing 626,000 wheels a year.

## **MORE EXPANSION**

Another Chicago plant was purchased in 1904 – the Chicago Car Wheel & Foundry Company at 43rd and Wood Streets. It had a capacity of 125, but was so poorly laid out it had to be rebuilt to increase output to 525.

There was little time for Thomas A. Griffin to sit back and relax. Orders in Chicago had increased at such a rate that neither Sacramento Square nor the Chicago Car Wheel plant could keep up with them, despite the fact that Sacramento Square additions had boosted its capacity to 1,400 wheels per day. One of the additions was another foundry containing 14 molding floors and one cupola. It was called the “west foundry” with the original shop known as the “east foundry.” A third foundry was erected in 1902 for the manufacture of brakeshoes. It closed after six years.

Griffin answered the demand for more wheels by acquiring 27 acres in Kensington and constructing another foundry close to the Pullman Company’s freight car plant. This plant began operations in 1906 with a capacity of 500 wheels a day, but was soon shut down in favor of a brand new building erected right next to it with twice the capacity!

This new Pullman plant was almost as large as Sacramento Square. It featured 42 circular floors, three circular groups of pits and three 100-inch cupolas. Its capacity was 1,000 wheels.

Suddenly, 17 years of building and expanding came to a halt. The boom of 1906 and 1907 was followed by a business depression and no new plants were acquired until 1914.

## **LONG AND HONORABLE SERVICE**

Many reasons can be cited for the quick success of the Griffin Wheel Company, not the least of which were dedicated personnel and sound management. The Griffins followed a policy of fair treatment to all and promotion from within. They also had a keen instinct for judging an employee's potential.

A case in point: Shortly after the Detroit foundry opened, Thomas F. Griffin hired A. G. Wellington, a college student, to do the bookkeeping. After working for a year Wellington quit to return to school. While interviewing other candidates for the opening Griffin discovered he had been paying Wellington only half the current wage for bookkeepers. The owner promptly paid Wellington the difference in salary for the entire year. That benevolent act changed the young man's mind and he continued with the Griffins for many years, eventually becoming secretary of the Griffin Wheel Company.

As it is not uncommon now, it was not uncommon then for employees to work at Griffin Wheel Company their entire careers. John J. McDermott, for instance, started in 1885 as a blacksmith at the Detroit plant. He retired 35 years later as superintendent of the Los Angeles plant. Another example is Charles F. Kopf who retired on April 1, 1929 as secretary of the company. He had started in 1889 as a stenographer to Thomas A. at the Blue Island shop.

With so many plants being built or purchased in such a short time, it took careful planning to insure that wheels in all plants were manufactured uniformly. To accomplish that Thomas A. Griffin published "Standard Practice" beginning in 1898. It explained in detail how the most efficient workers performed their job. It evolved into a handbook made up of the best ideas of all employees.

The organization plan of the Griffin Wheel Company changed several times in the company's growing years. Before 1895 Griffin dealt with a "Foundry Committee" composed of plant officials who were responsible for all operations at Sacramento Square. After 1895 a

local manager was placed in charge of each plant. These men were also members of a "Board of Managers" who met in Chicago. That plan was abandoned seven years later and W. G. Pearce was appointed a vice president and director in charge of the operations of all plants. Starting in 1916 the operations were supervised by several departments – sales, operating, inspection, accounting, and purchasing. All of the departments were under the jurisdiction of the executive committee, and represented in a departmental meeting held each Wednesday morning with a member of the executive committee as chairman.

## **GEORGE FRANCIS GRIFFIN 1881-1920**

George Francis Griffin, the only son of Thomas A. Griffin, first became associated with the company in 1903 following his graduation from Yale. After serving as manager of the inspection and review department, on August 1, 1907 he was elected vice president and secretary. "Griff," as he was known, was a sports enthusiast and part owner of the Chicago Cubs. When Griffin Wheel Company was sold to American Steel Foundries in 1919 George F. became a director and member of the executive committee. A year later he unexpectedly died at the age of 39. Although he never became president of the Griffin Wheel Company, George Griffin was widely known and respected. In a story in the *New York American*, written by Damon Runyon, he was eulogized as "kindly, considerate and genial – the salt of the earth. He will be sincerely mourned because he was sincerely loved. We shall not soon see the likes of 'Griff' again."

Thomas A. Griffin's other child, Marie, married Carl P. Dennett of Boston. He joined the Griffin organization in 1910 and became a vice president and member of the executive committee.

A European conflict was brewing in 1913 and America, under President Woodrow Wilson, would soon be involved. World War I ushered in a new era in international relations. The economic picture in the U.S., however, was improving and Thomas A. Griffin was anxious to resume opening wheel producing plants in major railroad cities.

## **LOS ANGELES, CALIFORNIA**

Los Angeles was the next city which would have a Griffin Wheel plant. A 300 capacity straight floor foundry was opened in February, 1914 on a 10-acre site that Griffin personally selected. Also at this time the firm was reorganized and capitalized at \$14,650,000.

These were to be Thomas A. Griffin's final acts of service to the company. He died on August 12, 1914 while on a trip to China to develop an export business for the Pacific coast plants.

In addition to being president and principal owner of the largest car wheel manufacturing company in the world, Griffin was president of the Association of Manufacturers of Chilled Car Wheels, a crusader against radical railroad legislation and the chief stockholder in a railroad tie plate company.

A disciplinarian and expert administrator, he worked hard at all times and demanded that his associates do likewise. Thomas A. Griffin was truly the most important supplier of chilled-iron car wheels the railroad industry had known.

## **FRANKLIN L. WHITCOMB**

Expansion of the Griffin Wheel Company was left to Franklin L. Whitcomb who had joined the company in 1889 as a sales agent in the Detroit plant. He was elected president in 1913 when Griffin became chairman of the board. Known for his good judgment and enthusiasm, Whitcomb proved to be a capable replacement for Griffin.

In July, 1919 the financial control of Griffin Wheel Company was obtained by American Steel Foundries, another railroad supply company. ASF makes steel castings for the railroads. Although Griffin Wheel became a subsidiary of ASF, it continued to operate independently of ASF.

## **COUNCIL BLUFFS, IOWA**

Following three years of testing, in 1920 Griffin Wheel decided to build a mechanized plant at Council Bluffs, Iowa. Although the plant was considered a marvel, its mechanical molding unit (the first of its kind) later had to be rebuilt.



SALT LAKE CITY IRON WHEEL PLANT

## **SALT LAKE CITY, UTAH**

In order to eliminate hauling wheels from Denver to Utah, Whitcomb decided to construct a mechanized plant in Salt Lake City. The facility opened in 1927 with a capacity of 210 wheels.

## **CLEVELAND, OHIO**

With the exception of Boston, all Griffin Wheel ventures were in the Western part of the country. But in the latter half of 1926 the scene shifts to Ohio. The Standard Car Wheel Company of Cleveland was purchased for \$500,000 and opened on December 9 with a capacity of 300 wheels. Five days later the plant was nearly destroyed by fire which entailed a loss of \$110,000

## **CINCINNATI, OHIO**

Also at this time the owners of Standard Car were building a new foundry in St. Bernard, a suburb of Cincinnati. Griffin Wheel purchased it for \$300,000 and spent an additional \$75,000 to complete it. Operations began in May of 1927 with a 300 wheel capacity.

That completed the chilled iron plant expansion program. The company now entered a busy but more stable period with the major thrust on improving production methods.

## **PRODUCTION IMPROVEMENTS**

Griffin Wheel has made notable contributions both to the improvement of the wheel itself and to the technique of manufacture. It made chemical analyses of wheels as far back as 1882, and began charging its cupolas according to chemists' formulas in the nineties. In 1890 the company borrowed an idea from the Chicago stockyards which were speeding the dissection of livestock by stringing up the animals from an overhead conveyor and moving them past a line of workmen, each of whom made his particular cut. Griffin installed overhead conveyors in its Sacramento Square plant to convey hot wheels and ladles of hot metal to their proper places.

## **ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS**

In 1908 Griffin Wheel took the lead in forming an association to guarantee the quality of wheels through a rigid system of inspection and control. The name of the organization was the Association of Manufacturers of Chilled Car Wheels and its headquarters from the beginning were at the Sacramento Square plant of the company. There were 24 foundries in the association.

One of the outstanding workers in the association was Frederick K. Vial, chief engineer of Griffin, whose contributions to design and manufacture were such that he was known as "Mr. Wheel Himself." He was the first person to develop scientific formulas for the designing of chilled iron car wheels to meet given service conditions.

Among outstanding accomplishments in chilled iron car wheel manufacturing he and other individuals at Griffin developed were: the sand blast cleaner, rotation pitting chilled rim and back of flange, arch plate wheel, reinforced flange, molding machines, mechanical molding equipment, single plate wheel, sulphur control and hot blast cupola, Vial also worked out a plan to preheat the blast going into the cupola by using waste cupola gasses. This method obtained 20 to 30 per cent savings in fuel, and improved the quality and predictability of wheels. Vial lived in LaGrange, Illinois, and like many other Griffin employees, was active in his community. He was president of its Board of Education for 12 years.

Griffin Wheel was directly responsible for two other notable developments that advanced the technique of making chilled iron car wheels. In 1939, Griffin's chief metallurgist worked out a formula to combine tellurium and graphite, resulting in wheels of highly uniform depth of tread hardness. The process was made standard by the Association of Manufacturers of Chilled Car Wheels. The other contribution was the development of satisfactory annealing pits. This was accomplished by developing a pit with asbestos lining. It proved to be so effective in retarding the escape of heat through the walls that the rate of cooling could be nicely controlled through vents in the top.

After closing the Cleveland operations, Griffin Wheel Company operated plants in 11 cities – Chicago, Council Bluffs, St. Paul, Kansas City, Denver, Salt Lake City, Tacoma, Los Angeles, Boston, Cincinnati and Detroit.

## **GRIFFIN BULLETIN**

There was quite a bit of competition among the plants. Much of it was encouraged by the *Griffin Bulletin*, a monthly publication written for all employees during the 1920s and 30s. The Bulletin contained a variety of information about the company, its product, plants and employees. Safety, productivity and company pride were stressed. For instance, a Safety Trophy was awarded to the plant that made the best showing in accident prevention during the year. The publication wrote this about the winning plant in 1929: "The organization at Denver Plant can now point with pride to this beautiful trophy as a symbol of a noteworthy accomplishment in 1929, and we are sure that all the readers of the Bulletin join us in extending congratulations to them, with best wishes for a continuation of the good work."

Also, each month the bulletin published operating loss results. Here is an example: "Sacramento Square plant is still running true to its 1926 form and for the fourth consecutive month finished in first place, reporting a loss of only 0.60%, consequently, it still holds first place for the year to date, with the remarkably low total net loss of 0.54%, a mark previously unequalled."

## **ERNEST P. WAUD**

After serving as Griffin Wheel president for 25 years, Franklin L. Whitcomb retired in 1938. He had been with the company 50 years. Elected as Griffin's fourth president was Ernest P. Waud, a graduate of Cornell University who began his career in 1905 as an inspector at the Denver plant. After transferring to Chicago, he climbed the ladder through the posts of chief inspector, manager of the review department, assistant treasurer, vice president and president.

## **MODERNIZATION – SACRAMENTO SQUARE**

During the 1930s, 40s and even 50s there was little change in most of the wheel producing plants. At Sacramento Square, however, in 1934 the buildings of the East foundry were torn down and replaced with a modern steel and glass structure, equipped with the latest installation of machinery for mechanical molding. The molding unit had a four pattern drag machine and three cope molding machines. The cupola had a 100 inch shell and the iron was melted with the pre-heat blast. A 15-ton bull ladle was also installed.

## **TYPICAL CHILLED IRON WHEEL FOUNDRY**

Chilled iron wheel foundries were operated much differently from today's steel wheel foundries. In the late 1940s an author toured Sacramento Square and described what he called the "endless motion." Here was his report and what he was seeing.

"The iron that goes into the cupola consists almost entirely of wheels that have been scrapped. You see piles of them out there, with worn treads, thin flanges, the flat spots, but in a matter of a few days they'll be reborn, ready to carry the nation's burdens another 110,000 miles.

"The process begins when a scrap wheel rolls down a gangway into a mechanical crusher where a dropped weight breaks it into a half dozen pieces. A magnet loads the pieces into a charging buggy which rides a track to a hoist that carries the buggy to the top of the cupola and dumps it. It's all automatic. No hands are involved.

“The hot-blast cupola converts the scrap wheel into molten iron. Coke and scrap are continually going into the top of the cupola and molten iron coming out the bottom. Every two minutes a ladle arrives at the spout of the cupola and receives just enough metal to pour two wheels.

“With its load of bubbling iron the ladle rides a track to the crane station where a crane lifts it in the air and transports it to the pouring station where two molds are waiting for it. The molds get to the spot in similar continuous fashion. Along one side of the big oval are several work stations. At one of these stands a big machine with four arms, a mechanical marvel that builds up the drag (or bottom half) of the mold in four stages, with workmen performing certain operations at each stage. A minimum of muscle power is involved.

“The built-up drag then travels by conveyor past three cope machines where the copes (or top half) of the molds are built up. Here you see, incorporated into the cope, the iron band that forms the tread and flange of the wheel.

“By means of hoists, cope and drag are mated and locked, and the completed mold is on its way to the pouring station, traveling past the observer one a minute, all day long. The procession is stately, deliberate and unending.

“The wheels are taken out of the molds at the shakeout platform, and placed in the annealing pits for their 72-hour cooling period. Putting wheels into the pits and taking them out is a mechanized job. No hands. No sweat.

“Once, the only test applied to a wheel was to swing a sledge hammer at a spot underneath the flange. It’s different today. After such cleaning operations as sand blasting and grinding, all wheels are surface-inspected for flaws, tested for roughness, weighed and taped for circumference. A wheel should be just 103.67 inches around, but may vary as much as a quarter inch either way. Other tests are the impact test to check against cracking and the thermal test to check for stress from heat.”

Some Griffin plants also had machine shops equipped for mounting wheels on axles.

## CHANGING TIMES

Breadlines, 12 million people out of work and bank failures – the early 1930s were difficult years, to say the least. They were also changing times. The communication and transportation systems in the United States were growing by leaps and bounds.

The railroad industry was no exception. Inventors were looking for alternatives to the steam engine, which had powered trains since the 1830s. They wanted an energy source which would move longer trains at faster speeds. The solution turned out to be the diesel engine.

The first diesel powered train amazed persons across the country by hitting speeds of 104 miles per hour on April 7, 1934. It was a passenger train built for the Burlington Route and called the Pioneer Zephyr. Six years later diesel engines were pulling 109 loaded freight cars at a speed of 60 miles per hour.

The diesel sparked new concepts in railroad service. Freight cars became larger and carried greatly increased loads at faster average speeds. As a result, stresses increased and wheels wore out more quickly. Chilled iron wheels could handle the loads, but they were generally not designed for use on diesel powered trains. The challenge was for Griffin Wheel Company to design a wheel with greater flange and rim strength – one better able to take heavy braking without shelling or thermal cracking.

## **BIRTH OF A NEW WHEEL**

In 1941 Griffin Wheel Company, continuing its policy of always trying to improve its product, began studies to find the best way to manufacture steel wheels. Research and tests were conducted at Sacramento Square under the direction of Edmund Q. Sylvester, a brilliant engineer. Finally in 1952 Griffin revealed its new product—a steel wheel with more uniformity, smaller tolerances, greater rotundity and better balance than any wheel ever made. Using Sylvester's initials, Griffin called its new wheel the EQS Wheel for Electric Quality Steel. The development of the steel wheel took 10 years to complete and cost more than \$10 million. American Steel Foundries made this development money available as well as the funds to build the new steel wheel plants that followed.

The starting point in Griffin's search for a better way to produce steel wheels began with a quest for a better mold material, one which did not use sand. Graphite was one of the materials studied. It previously had been used by the company to cast huge counter weights for a drawbridge. A surprisingly smooth surface finish had been obtained. Intensive experiments showed it to be an ideal mold material. Graphite is one of the few materials which has the capacity to withstand the action of molten steel without cracking. The mold that Griffin Wheel developed for the wheels was the largest graphite mold ever made.

Another hurdle that had to be conquered was pouring of the steel. In initial tests, molten steel was poured into the graphite mold from a conventional ladle. The force of the rushing steel washed away portions of the mold surface. Some method of controlled pouring had to be devised. Finally, air pressure was used to force the molten steel up from a sealed chamber, through a refractory tube, into the mold cavity. The rate at which the steel moved into the mold was controlled by the air pressure applied. The resulting wheel had a smooth surface finish – so smooth no machining was required. Controlled Pressure Pouring was born.

Laboratory tests verified the strength and safety of pressure poured wheels, and in 1952 the Chicago pilot plant became the nation's first commercial pressure pouring operation. Further tests were made on gruelling cross-country trips. Results showed that these cast steel wheels lasted three times longer than chilled iron wheels. Griffin had discovered a way to manufacture cast steel wheels; its position of leadership was maintained.

## **ST. HYACINTHE, QUEBEC, CANADA**

In 1952, Griffin announced plans to build steel wheel production plants in Chicago and St. Hyacinthe, Quebec, Canada. The Chicago plant was enlarged from the original pilot plant while the Canadian plant started operation in 1954, and was the first completely new cast steel wheel producing plant in North America, and the basis for the formation of Griffin Steel Foundries, Ltd., headed by Mr. D. V. Hamilton, Vice-President and General Manager.

## **HERBERT J. ROSEN**

Griffin Wheel's president in 1952 was Herbert J. Rosen, who was elected four years earlier as the company's fifth president. Like other Griffin officers, he proved himself by years of dedicated service. Rosen started 1900 in the office at the Denver plant. His experience was rounded by serving in various departments, including the post of cashier at several plants, assistant to chief engineer Vial, sales agent in Denver, operating manager in Chicago and on up through the vice-presidency to the post of president.

## **EDMUND Q. SYLVESTER**

Rosen retired in 1953 after 53 years of company service. E. Q. Sylvester, who had played such an important role in the development of the new steel wheel, replaced him as president. Sylvester resigned just two years later in order to establish a business for manufacturing wheels in South Africa.

## **GOFF SMITH**

Goff Smith was then elected Griffin Wheel's seventh president. Smith joined American Steel Foundries in 1946 and was a sales engineer and manager of railway sales before becoming Griffin's executive vice-president and president. He is a graduate of the University of Michigan and Massachusetts Institute of Technology. Smith was the driving force behind the development of the Controlled Pressure Pouring process. He currently is president of Griffin Wheel's parent company, AMSTED Industries Incorporated .

The mid-1950s and early 1960s were busy years for both the railroads and Griffin Wheel Company because steel wheels were continually replacing chilled iron wheels. In 1957 it was estimated that half of the 16 million freight car wheels in use on American and Canadian freight cars were made of iron. To speed up the conversion to steel, Griffin began an ambitious plant building program. More than \$40 million was invested to build six controlled pressure pouring plants from 1954 to 1964. These facilities, all similar in design, were spread across North America to insure quick delivery to the railroads.

## **COLTON, CALIFORNIA**

In 1957 Griffin opened its third steel wheel plant located in Colton, California (near Los Angeles).

## **KANSAS CITY, KANSAS**

A year later, in 1958, a plant was opened in Kansas City, Kansas.

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### **TRANSCONA, MANITOBA, CANADA**

Also in 1958, a second plant in Canada was opened in Transcona, Manitoba (near Winnipeg). Both the Canadian plants were operated by Griffin Steel Foundries, Ltd., a subsidiary of American Steel Foundries, later AMSTED Industries Incorporated.

### **BENSENVILLE, ILLINOIS**

The largest Griffin plant up to this time was opened in late 1961 in Bensenville, Illinois. Located on a 36 acre site, the plant covers 135,000 square feet and is adjacent to a company research laboratory.

## **BESSEMER, ALABAMA**

Two years later, in 1963, a plant opened in Bessemer, Alabama.

## **END OF THE CHILLED IRON WHEEL**

Thus by 1963, Griffin Wheel Company was operating five steel wheel plants (Chicago, Bensenville, Bessemer, Colton and Kansas City) in the United States and Griffin Steel Foundries Ltd., was operating two plants in Canada. During the transition period, the chilled iron plants were closed on a gradual basis with the last two being shut down in 1963. For Griffin Wheel Company, 76 years of making chilled iron wheels had finally come to an end. The Chicago plant discontinued production of cast steel wheels – late 1963.

To see how a pressure poured steel wheel is manufactured, at a typical Griffin wheel plant, let's take a verbal tour, accompanied by colored photographs that were taken by the World Book Encyclopedia to depict a study in automation at work.

## **PRESSURE POURING IN ACTION**

A 16-ton capacity electric arc furnace melts scrap metal turning it into molten steel. This steel is then poured into a ladle which when full is moved to a pressure chamber submerged in the plant's floor. The ladle is sealed in the air tight chamber by a steel cover that has a pouring tube attached to it. A graphite mold then is automatically positioned over the pouring tube. An operator pushes a button which increases air pressure in the chamber forcing the molten steel up through the pouring tube into the mold. Once full, the graphite mold is lifted onto a conveyor line and another mold quickly moves over the pouring tube.

As the graphite mold is lifted away a red-hot railroad wheel is revealed. It cools quite rapidly and in less than 10 minutes after pouring, the wheel is solid enough to be lifted from the mold. Next, the wheel enters a brick-lined cooling kiln where it is cooled from 2,000 to 1,000 degrees to prevent stress.

Following that, the hub of the wheel, which has been cast solid, is cut out with an oxygen-gas torch and then rough bored for easier axle mounting. Because of the accuracy of the graphite mold, the surface of the wheel is already smooth and no other machining operations are needed.

The wheel, now below 1,000 degrees, is moved into a rotary hearth normalizing furnace for a 90 minute heat treatment at 1,650 degrees. After four final steps – shot blasting, magnetic particle inspection, ultrasonic tests and final hub boring – the wheel is ready for service.

The graphite molds are used many times before they are re-machined to maintain a perfect contour.

## **TACOMA BRASS FOUNDRY**

The Tacoma, Washington plant is being operated by the Griffin Wheel Company as a brass foundry producing railroad journal brass bearings.

## **GRIFFIN PIPE PRODUCTS CO.**

Although the railroad wheel has been by far Griffin Wheel's most important product, it hasn't been its only one. In 1960 the iron wheel plant in Council Bluffs was converted into a cast iron pressure pipe facility capable of producing pipe for water distribution in 20 foot lengths and various diameters. Shortly later, the pipe operations were organized into a separate entity called Griffin Pipe Products Co..

## **ANCHOR COMPOSITION BRAKE SHOES**

Griffin reentered the field of railroad brake shoes in 1959 by marketing ANCHOR composition brake shoes made by Raybestos-Manhattan, Inc., in Crawfordsville, Indiana. In 1970 the Griffin Steel Foundries Ltd. plant in St. Hyacinthe began manufacturing ANCHOR brake shoes. In 1977 Griffin Wheel Company started production of composition brake shoes for the first time in the United States, with Raybestos-Manhattan ceasing to make them. Griffin's ANCHOR brake shoe plant is located in West Chicago, Illinois. The multi-million dollar facility employs about 75 persons.

## **J. ROSS DREVER**

President Goff Smith continued directing Griffin from 1955 until 1960 during the crucial wheel transition period. J. Ross Drever was elected Griffin president in January, 1960 and Smith became a Vice-President of American Steel Foundries (reorganized as AMSTED Industries Incorporated, in 1963), the company with overall responsibilities for Griffin Wheel Company, Griffin Steel Foundries, Ltd., Griffin Pipe Products Co., American Steel Foundries and 6 other companies. Drever, an engineer with expertise in research and development, had been active in setting up the operations at the new steel wheel plants. He served as Griffin president until December, 1961 when he became president of the AMSTED Research Laboratories, an experimental facility built in Bensenville, Illinois by the Griffin Wheel Company to continue its research on the pressure pouring process and adapting it to other uses in the steel industry. While this facility is under the direct control of AMSTED Industries Incorporated today, some Griffin Wheel Company employees are assigned to the Lab.

## **MISCELLANEOUS CASTINGS**

Another product line Griffin manufactured was iron castings. For about 50 years the company had been making them for use in pulverizing mills and mulling applications. In 1967 Griffin marketed these castings directly to the customers. Today this operation has been discontinued.

## **KEOKUK, IOWA**

Since 1961 Griffin Wheel Company added capacity at all its steel wheel producing plants; installed a computer system, which in addition to financial and sales oriented reporting, prepares a series of reports which monitor the wheel making process; signed contracts with outside companies to better evaluate Griffin products through the use of computer simulations; and broke ground in 1976 for a 3 furnace steel wheel plant at Keokuk, Iowa that will have the capacity to turn out 1,000 wheels a day. These feats would have brought a smile to the faces of the first two presidents . . . Thomas F. Griffin and Thomas A. Griffin.

## **CEDRIC P. VOLL**

Cedric P. Voll was elected the ninth president of Griffin, a position he still holds. A certified public accountant and graduate of the University of Wisconsin, Voll began his career in 1940 as an accountant and internal auditor for American Steel Foundries. After military service as a Navy officer, he joined Griffin Wheel Company. His positions included—assistant to the secretary and treasurer, 1947; auditor, 1948; controller, 1950; treasurer and controller, 1954. In 1961, he was named president of Griffin Wheel Company and Griffin Steel Foundries Ltd.

## **WHEEL MOUNTING FACILITIES**

As an aid to the railroads and freight car builders, Griffin Wheel in 1967 built a wheel mounting facility at Bensenville. It is capable of turning out 6,000 car sets of axle assemblies a year.

In February, 1975 Griffin completed another building for the purpose of constructing and maintaining tools and gages; all for captive use.

The following year these facilities were increased to meet the needs for additional tools and gages because of plant expansions and the new Keokuk Wheel Plant and West Chicago Brake Shoe Plant.

## **TOOL ROOM**

A major result of Griffin research is its deep-dish parabolic wheel. Using an induction coil and high-frequency generator to create a controlled source of heat to simulate braking application, the company evaluated various contours. These tests proved the deep-dish parabolic shape had lower overall thermal stress patterns than S plate or straight plate wheels.

## **KEOKUK, IOWA**

Griffin's penchant for staying ahead of the competition is never ending. With railroads playing a leading role in the transportation of coal, grain and industrial products, the need for more wheels continued during the early 1970's. So Griffin Wheel Company, as mentioned earlier in 1974, announced it was going to build another steel wheel plant – its largest ever – in Keokuk, Iowa. The facility will have a capacity of 1,000 wheels a day and is being built on a 119 acre site. About 200 persons will be employed when operations begin during 1977.

This extensive 30 year research and expansion program could not have been accomplished without the backing of Corporation Top Management, most notably the current chairman of the board J. B. Lanterman and past chairman C. C. Jarchow. Also special help to Griffin has come through R. H. Wellington, presently Executive Vice-President of AMSTED Industries Incorporated, and J. Woodburn, presently the Corporate Vice-President in charge of Griffin operations.

## **NEW PLANTS AND NEW OFFICE**

These new plants bring the story of the Griffin Wheel Company to 1977, 100 years after its founding in Detroit. But a company's centennial is significant only if its progress during that 100 years has contributed to the welfare of mankind – with needed and dependable products, better technology, and loyal service. This history shows that Griffin has something to celebrate. It is the largest producer of railroad wheels in the world. It is expanding its production of Anchor composition brake shoes. It is carrying forward a tradition of excellence.

In September, 1975 the company moved its general office from the Sacramento Square location to 200 West Monroe in downtown Chicago, Illinois. The following pages show some areas of this new location as well as many of the general office employees.

## **GRIFFIN MILESTONES**

### **1877-1977**

- 1877** The company is founded in Detroit on October 5 by Thomas Francis Griffin. Its name is Griffin Car Wheel Company, and railroad car wheels are the major product.
- 1881** Thomas A. Griffin, the founder's son, moves to Chicago to open a chilled iron wheel plant with a capacity of 25 wheels a day.
- 1882** The company starts to make a chemical analysis of its wheels as a service to railroad customers.
- 1885** A new Chicago plant, with a capacity of 250 wheels a day, is built on Robey Street, south of Blue Island. Thomas A. Griffin is elected company president.
- 1890** To meet sharply rising wheel demand, 32 acres of land are purchased on Chicago's Sacramento Avenue, and a plant is completed by December. Capacity there reaches 300 wheels per day in 1891, 425 in 1892, and 700 by 1894.
- 1894** On January 6, the company name is shortened to Griffin Wheel Company.
  
- 1895** Griffin starts its move to become a nationwide company. A chilled iron wheel plant is built in Overland, Colorado, outside Denver. This year, the company manufactures 198,000 wheels.
- 1896** A foundry in St. Paul is bought and converted to iron wheel production.
- 1897** A plant is added in Tacoma, Washington.
- 1899** A Kansas City, Kansas, foundry is purchased.
- 1901** The Boston Car Wheel Company is acquired and changes its name to Griffin Wheel Company-Boston.
- 1905** Another Chicago wheel foundry is acquired.
- 1906** An additional Chicago wheel foundry is built close to the Pullman Company's freight car plant. This year, Griffin manufactures 1,198,000 railroad wheels, the first time annual output exceeds a million.
- 1908** Griffin takes the lead in forming the Association of Manufacturers of Chilled Iron Wheels. Its goal is to guarantee the quality of railroad wheels through inspection and manufacturing controls.

- 1913** Franklin L. Whitcomb elected president.
- 1914** A new wheel plant is built in Los Angeles.
- 1919** Griffin is acquired by American Steel Foundries, today known as AMSTED Industries.
- 1920** The company builds a highly mechanized wheel plant at Council Bluffs, Iowa.
- 1923** Griffin delivers 1,500,000 wheels to customers in a single year. This was the company's high point in annual wheel production. Production now adjusts itself to meet the needs of a railroad system which had passed through its years of rapid expansion and was leveling off. In addition, wheels were so improved, they lasted almost twice as long.
- 1924** The company perfects the hot-blast cupola.
- 1928** Griffin's single-plate wheel is adopted as the standard by the Association of American Railroads.
- 1938** Ernest P. Waud becomes the company's fourth president.
- 1939** Company metallurgists use a combination of tellurium and graphite to precisely control the depth of tough chilled iron in the wheel tread.
- 1941-**
- 45** Griffin's wheel production aids the war effort.
- 1948** Herbert J. Rosen elected president.
- 1951** Griffin's chilled iron wheel plants span the nation — Boston, Cincinnati, Detroit, Chicago, St. Paul, Council Bluffs, Kansas City, Denver, Salt Lake City, Los Angeles, Tacoma.
- 1952** On its 75th anniversary, Griffin moves into the modern era of railroad wheel making by developing its patented Controlled Pressure Pouring process of casting steel wheels. (Please see pages 16-19.) The diesel locomotive was on the scene, and these diesels could pull larger freight cars with heavier loads at faster average speeds. Iron wheels wore quickly, and tougher steel wheels were needed. Griffin's pressure poured steel wheels lasted three times longer than chilled iron, and a second railroad revolution took place — this time under freight cars — as steel wheels replaced iron ones. The company's first pressure pouring plant started production at Sacramento Blvd. in Chicago. This year, the company also started to use magnetic particle inspection to improve quality control.

- 1953** E. Q. Sylvester elected president.
- 1954** Griffin built its first Canadian pressure pouring plant for steel wheels at St. Hyacinthe, near Montreal. The Canadian plants are operated by Griffin Steel Foundries Ltd., a subsidiary of AMSTED Industries.
- 1955** Goff Smith is elected president. The company also embarks upon a joint venture with Raybestos-Manhattan, Inc. Raybestos will produce Anchor composition brake shoes for the railroads, and Griffin will market this new product.
- 1957** A steel wheel pressure pouring plant is completed at Colton, California. The first Anchor brake shoes are produced on a production line basis at the Raybestos plant in Crawfordsville, Indiana.
- 1958** A steel wheel plant is built at Kansas City, Kansas.
- 1959** Another Canadian steel wheel plant is completed at Transcona, outside Winnipeg.
- 1960** J. Ross Drever elected president.
- 1961** C. P. Voll elected Griffin's ninth president. A steel wheel pressure pouring plant is completed at Bensenville, Illinois northwest of Chicago.
- 1962** The company begins using computers to help improve railroad wheels.
- 1964** Griffin opens another U.S. steel wheel plant at Bessemer, Alabama.
- 1965** The company institutes ultrasonic testing to inspect each steel wheel before shipment.
- 1967** A wheel mounting facility is added at the Bensenville, Illinois, plant.
- 1969** Griffin initiates production of Anchor composition brake shoes at the St. Hyacinthe plant.
- 1975** The company moves to a new headquarters at 200 West Monroe Street in Chicago.
- 1976** Major construction projects are underway. The company is building a new plant at Keokuk, Iowa which will be its largest with a capacity of 1,000 railroad wheels a day. It is scheduled to be completed in late 1977. Also under construction is a plant to manufacture Anchor composition brake shoes in West Chicago, Illinois. It will be the company's first brake shoe manufacturing plant in the United States when it begins operations in early 1977.