

Carolina Conductor



Volume 4 Number 8

Monthly Newsletter of the Carolina Railroad Heritage Association, Inc.

August 2017

Preserving the Past. Active in the Present. Planning for the Future.

Web Site: hubcityrrmuseum.org
Facebook: Carolina Railroad
Heritage Association

Meeting Site:
Woodmen of the World Bldg.
721 East Poinsett Street
Greer, SC 29651-6404
Third Friday of the Month at 7:00 pm

**Hub City Railroad Museum
and SOU Caboose #X3115:**
Spartanburg Amtrak Station
298 Magnolia Street
Spartanburg, SC 29301-2330
Wednesday 10-2 and Saturday 10-2

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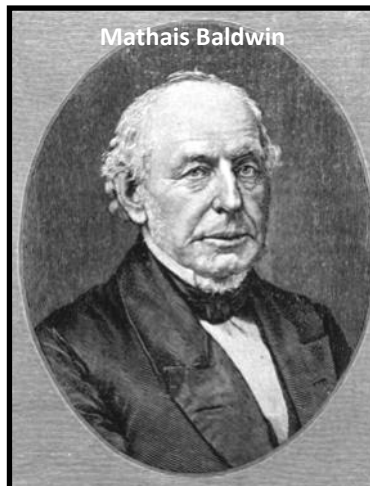
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Articles and club news due by the
2nd Wednesday of month.

Baldwin Locomotive Works

Part 1

The Baldwin Locomotive Works (BLW) was an American builder of railroad locomotives. It was originally located in Philadelphia, and later moved to nearby Eddystone, Pennsylvania. Although the company was very successful as the largest producer of steam locomotives, its transition to the production of diesels was far less so. Later, when the early demand for diesel locomotives to replace steam tapered off, Baldwin could not compete in the marketplace. It stopped producing locomotives in 1956 and went out of business in 1972, having produced over 70,000 locomotives, the majority powered by steam. This company is not to be confused with E. M. Baldwin of Australia who made small locomotives for such things as sugar cane tramways.



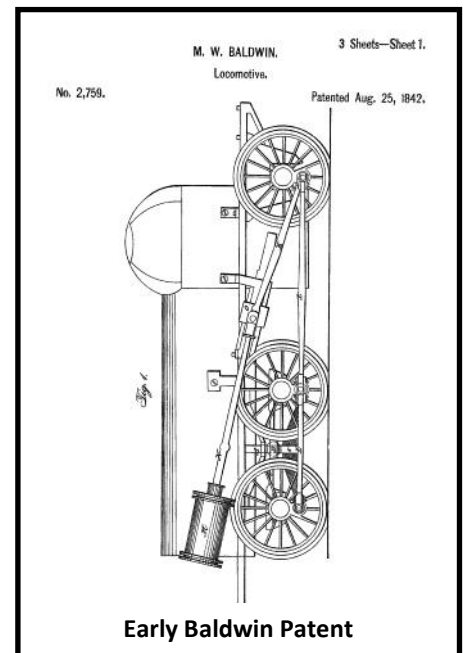
Mathais Baldwin

The Beginning

The BLW had a humble beginning. Matthias W. Baldwin, the founder, was a jeweler and whitesmith,^[1] who, in 1825, formed a partnership with a machinist, and engaged in the manufacture of bookbind-

ers' tools and cylinders for calico printing. Baldwin then designed and constructed for his own use a small stationary engine, the workmanship of which was so excellent and its efficiency so great that he was solicited to build others like it for various parties, and thus led to turn his attention to steam engineering. The original engine was in use and powered many departments of the works for well over 60 years, and is currently on display at the Smithsonian Institution in Washington, DC.

In 1831, at the request of the Philadelphia Museum, Baldwin built a miniature locomotive for exhibition which was such a success that he received that year an order from a railway company for a locomotive to run on a short line to the suburbs of Philadelphia. The Camden and Amboy Railroad Company had shortly before imported a locomotive (*John Bull*) from England, which was stored in Bordentown, New Jersey. It had not yet been assembled by Isaac Dripps when Baldwin visited the



Early Baldwin Patent

Continued on Page 3 - Baldwin

Arrivals

Locomotive Builders in the United States

The compiled list of locomotive manufacturers from Wiki is shown to allow you to understand where we are in the present and where we were in the past. We will be discussing many of these companies in future issues of the *Carolina Conductor*.

Active Companies

Brookville Equipment Corp.
 CLCX, LLC - Process Loco
 Colmar
 Electro-Motive Diesel
 GE Transportation
 Harsco Corporation
 Katiland Trains
 Kloke Locomotive Works
 Knoxville Locomotive Works
 Merrick Light Railway
 Motive Power & Equipment Solutions, Inc.
 National Railway Equipment Co.
 NS Juniata Locomotive Shop
 Progress Rail Services Corp.
 RAILSERVE Leaf
 RELCO Locomotives
 Republic Transportation Systems -
 Republic Locomotive
 Sygnet Rail Technologies
 Train Rides Unlimited
 Tweetsie Railroad - Source for Crown Metal
 Products
 Wasatch Railroad Contractors
 Wabtec
 Wiese

Defunct Companies

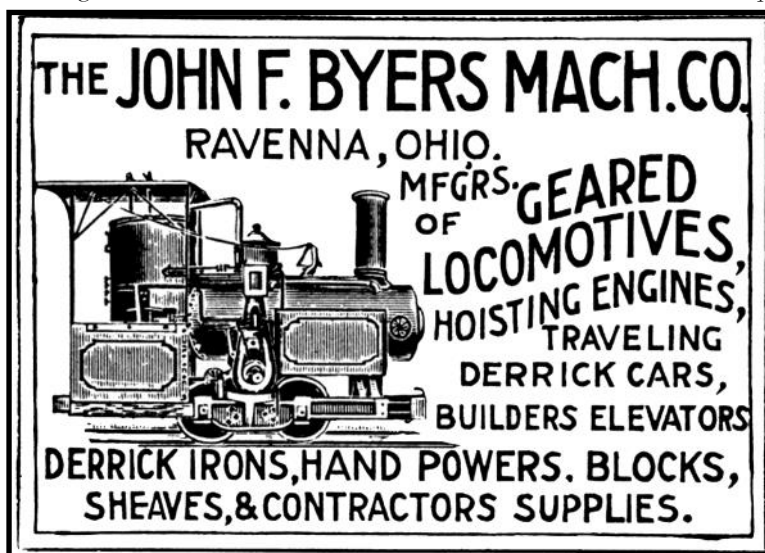
Altoona Machine Shops
 American Locomotive Co.
 Amoskeag Locomotive Works
 Appomattox Locomotive Works
 Atlas Car and Manufacturing Co.
 Baldwin Locomotive Works - later known
 as Baldwin-Lima-Hamilton
 Bell Locomotive Works
 Brooks Locomotive Works
 Burr and Ettinger
 Cagney Locomotive Works
 Cincinnati Locomotive Works
 - also known as Harkness and as
 Moore & Richardson
 Climax Manufacturing Company

Cooke Locomotive and Machine Works
 Covington Locomotive Works
 Crown Metal Products
 Custom Fabricators
 Davenport Locomotive Works
 Denmead
 Dickson Manufacturing Co.
 Dunkirk Engineering Co.
 Eastwick and Harrison
 Euclid Road Machinery Co.
 Fairbanks-Morse
 Globe Locomotive Works
 Glover Locomotive Works
 Grant Locomotive Works
 H.K. Porter, Inc. - Smith & Porter, later
 Porter, Bell & Co.
 Heisler Locomotive Works
 Hicks Locomotive and Car Works
 Hinkley Locomotive Works
 Hurlbut Amusement Co.
 Ingalls Shipbuilding
 Kentucky Locomotive Works
 Lancaster Locomotive Works
 Lawrence Machine Shop
 Lima Locomotive Works - later Lima-
 Hamilton, then Baldwin-Lima-Hamilton
 Locks and Canals Machine Shop
 Lowell Machine Shop
 Manchester Locomotive Works
 Mason Machine Works
 McQueen Locomotive Works
 Mount Savage Locomotive Works
 Nashville Manufacturing Co.
 Newcastle Manufacturing Co.
 New Jersey Locomotive and Machine Co. -
 began as Swinburne, Smith & Co.

New York Locomotive Works - also known
 as Breese, Kneeland & Company
 Niles and Company
 Norris Locomotive Works
 Ottaway Amusement Co.
 Pittsburgh Locomotive and Car Works
 Plymouth Locomotive Works
 Portland Company
 Rhode Island Locomotive Works
 Richmond Locomotive Works
 Rogers Locomotive and Machine Works -
 also known as Rogers, Ketchum &
 Grosvenor
 Rome Locomotive Works
 Ross Winans Locomotive Works
 Schenectady Locomotive Works
 St. Louis Car Company
 Swinburne, Smith and Co.
 T. H. Paul & Sons
 Talbott and Brother Iron Works
 Taunton Locomotive Mfg. Co.
 Tredegar Iron Works
 Union Iron Works
 United Aircraft
 Virginia Locomotive and Car Works - also
 known as Smith & Perkins
 Vulcan Iron Works
 West Point Foundry
 Westinghouse Electric Corp.
 Whitcomb Locomotive Works
 Ernst Wiener Co.
 Wilmarth

In addition to these, many railroads operating steam locomotives built locomotives in their shops. Notable examples include the Baltimore and Ohio Railroad's Mount Clare Shops, Norfolk and

Western's Roanoke Shops, Pennsylvania Railroad's Altoona Works and the Southern Pacific's Sacramento Shops. An estimate of total steam locomotive production in the United States is approximately 175,000 engines, with Baldwin having built nearly 70,000 of these alone.



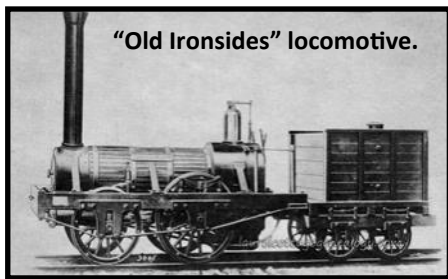
Departures

Continued from Page 1 - *Baldwin*

spot. He inspected the detached parts and made notes of the principal dimensions. Aided by these figures, he commenced his task.

The difficulties attending the execution of this first order were such that they are not easily understood by present-day mechanics. Modern machine tools simply did not exist; the cylinders were bored by a chisel fixed in a block of wood and turned by hand; the workmen had to be taught how to do nearly all the work; and Baldwin himself did a great deal of it with his own hands.

It was under such circumstances that his first locomotive, christened *Old Ironsides*, was completed and tried on the Phila-



"Old Ironsides" locomotive.

delphia, Germantown and Norristown Railroad on November 23, 1832. It was at once put in active service, and did duty for over 20 years. It was a four-wheeled engine, weighing a little over five tons; the driving wheels were 54 inches in diameter, and the cylinders were of 9½ inches bore by 18 inches stroke. The wheels were of heavy cast iron hubs, with wooden spokes and rims, and wrought iron tires, and the frame was made of wood placed outside the wheels. It had 30-inch diameter boiler which took 20 minutes to raise steam. Top speed was 28 mph.

Early Years

Baldwin struggled to survive the Panic of 1837. Production fell from 40 locomotives in 1837 to just nine in 1840 and the company was heavily in debt. As part of the survival strategy, Matthias Baldwin took on two partners, George Vail and George Hufty. Although the partnerships proved relatively short-lived, they helped Baldwin pull through the economic hard times. In the 1850s, railroad building became a national obsession, with many new

carriers starting up, particularly in the Midwest and South. While this helped drive up demand for Baldwin products, it also increased competition as more companies entered the locomotive production field.

Still, Baldwin had trouble keeping pace with orders and in the early 1850s began paying workers piece-rate pay. Taking advantage of human nature, this increased incentives and productivity. By 1857, the company turned out 66 locomotives and employed 600 men. But another economic downturn, this time the Panic of 1857, cut into business again. Output fell by 50 percent in 1858.

1860-1899

The Civil War at first appeared disastrous for Baldwin. At the start of the conflict Baldwin had a great dependence on Southern railways as its primary market. In 1860, nearly 80 percent of Baldwin's output went to carriers in states that would soon secede from the Union. Thus, Baldwin's

production in 1861 fell more than 50 percent compared to the previous year. However, the loss in Southern sales was counterbalanced by purchases by the U.S. Military Railroads and the Pennsylvania Railroad, which saw its traffic soar, as Baldwin produced more than 100 engines for carriers during the 1861–1865 war.

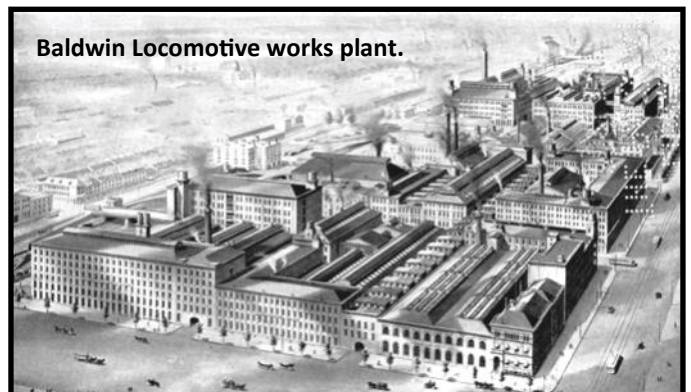
By the time Matthias Baldwin died in 1866, his company was vying with Rogers Locomotive and Machine Works for the top spot among locomotive producers. By 1870 Baldwin had taken the lead and a decade later, it was producing 2½ times as many engines as its nearest competitor, per the U.S. Manufacturing Census.

In 1897, BLW was presented as one of the examples of successful shop management in a series of articles by Horace Lucian Arnold. The article specifically described the Piece Rate System used in the shop management.

Burton (1899) commented, that “in the BLW piecework rates are seldom altered. Some rates have remained unchanged for the past twenty years, and a workman is there more highly esteemed when he can, by his own exertions and ability, increase his weekly earnings. He has an absolute incentive to increase his output as much as he possibly can, because he knows that he will not, by increasing his own income, lead to cutting piece-work rates, and so be forced to make still further exertions to maintain the same weekly wage.”

History: 20th Century

Initially, Baldwin built many more steam locomotives at its cramped 196



Baldwin Locomotive works plant.

Continued on Page 4 - *Baldwin*

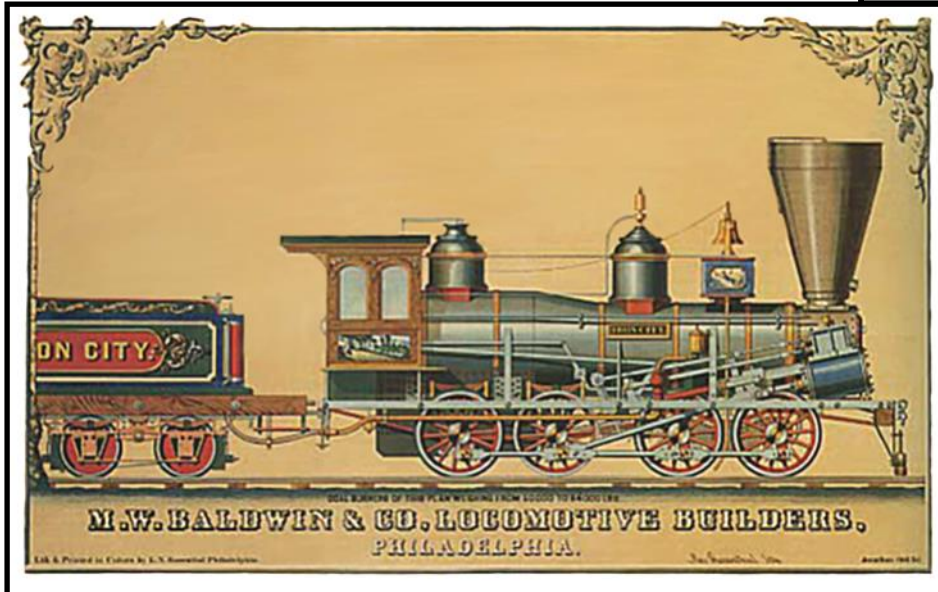
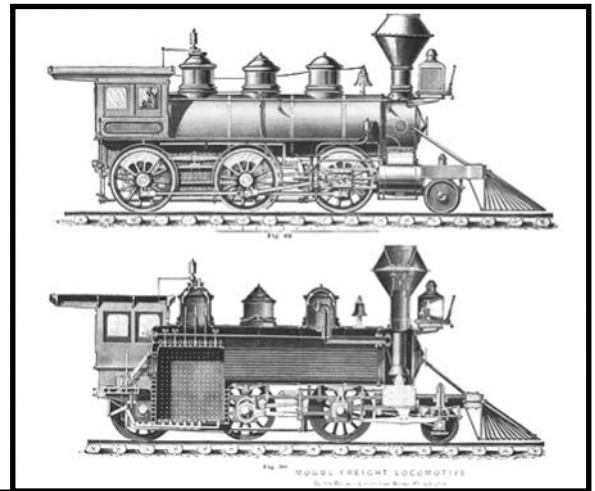
Manifest

Continued from Page 3 - *Baldwin*

acres Broad Street Philadelphia shop but would begin an incremental shift in production to a 616 acres site located at Spring Street in nearby Eddystone, Pennsylvania, in 1906. Broad Street was constricted, but even so, it was a huge complex, occupying the better part of 8 square city blocks from Broad to 18th Streets and Spring Garden Street to the Reading tracks just past Noble Street. Eddystone on the other hand was spread out over 600 acres. Its capacity was well over 3000 locomotives per year. The move from Broad Street was completed in the late 1920s.

inghouse marketed Baldwin-Westinghouse electric locomotives and A.C. electrification of railroads, particularly to the New Haven Railroad.

In 1906 the Hepburn Act authorized greater governmental authority over railroad companies, and revitalized the Interstate Commerce Commission (ICC), which stepped up its activities. The ICC was given the power to set maximum railroad rates, and to replace existing rates with “just-and-reasonable” maximum rates, as



the locomotive builders.

Baldwin’s locomotive output dropped from 2,666 in 1906 to 614 in 1908. The company cut its workforce from 18,499 workers in 1907 to 4,600 the following year. Baldwin’s business was further imperiled when William P. Henszey, one of Baldwin’s partners, died. His death left Baldwin with a US \$6 million liability. In response, Baldwin incorporated and released US \$10 million worth of bonds. Samuel Vauclain wanted to use these funds to expand Baldwin’s capacities so it would be prepared for another boom. While other Baldwin officers opposed this expansion, Vauclain’s vision won out; BLW would continue to expand its Eddystone plant until its completion in 1928. By 1928, the company moved all locomotive production to this location, though the plant would never exceed more than one-third of its production capacity.

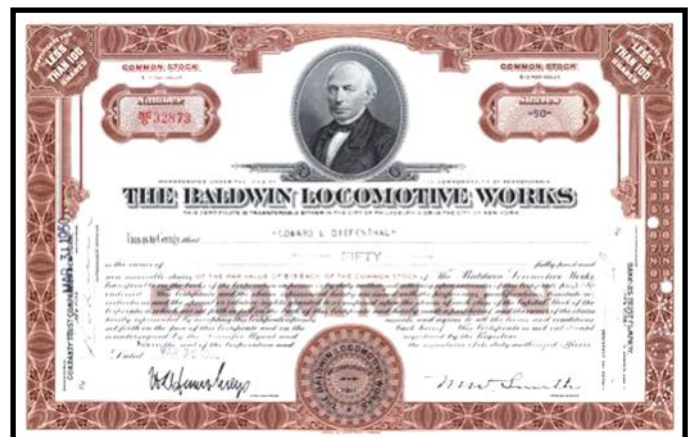
Gilded Age

The American railroad industry expanded significantly between 1898 and 1907, with domestic demand for locomotives hitting its highest point in 1905. Baldwin’s business boomed during this period while it modernized its Broad Street facilities. Despite this boom, Baldwin faced many challenges including the constraints of space in the Philadelphia facility, inflation, increased labor costs, Labor tensions, the substantial increase in the size of the locomotives being manufactured and the formation of the American Locomotive Company, an aggressive competitor which eventually became known simply as Alco.

From 1904 to 1943, Baldwin and West-

defined by the ICC.

The limitation on railroad rates depreciated the value of railroad securities, and meant that railroads stopped ordering new equipment, including locomotives. This may have been a factor in precipitating the Panic of 1907, which in turn disrupted finance and investment in new plants. Both events had a direct negative effect on the railroad industry, especially



Rare Mileage

Samuel Vauclain

In 1832 Mathias Baldwin constructed the “first practical locomotive built and run in Pennsylvania” with the help of a railroad mechanic named Andrew Constant Vauclain. By 1856 Vauclain had risen to become a roundhouse foreman for the Pennsylvania Railroad. With the promotion came an increase in pay, but it also forced Vauclain to separate from his family. In February 1856, he left his children and his wife, Mary A. Vauclain, who was five months pregnant, and he relocated to Altoona, Pennsylvania. Shortly after the birth of a son, Samuel, she moved the family from Port Richmond to Altoona, the center of Pennsylvania Railroad Company operations and the place of Samuel M. Vauclain’s rearing and education.

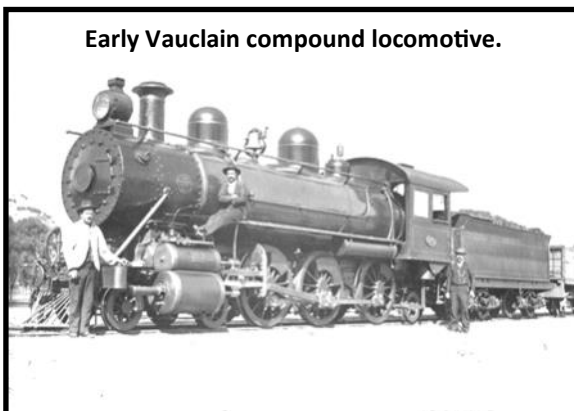
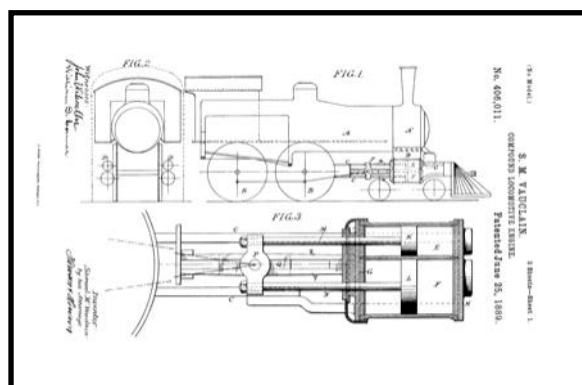
Samuel Matthews Vauclain (May 18, 1856 – February 4, 1940) gradually acquired his father’s taste for locomotives and quickly ascended from the lower ranks of the railroad production community to become a locomotive manufacturer, inventor, salesman, and international businessman. When he turned 16 S. M. Vauclain decided not to attend college and, with his father’s help, found employment in the repair shops of the Pennsylvania Railroad. The next year he signed a four-year indenture contract with the Pennsylvania Railroad Company. When the period of indenture ended in 1877, Vauclain was promoted to Assistant Foreman. The \$150-200 per month salary allowed Vauclain to provide for a family, and on April 17, 1879, Vauclain married Annie Kearney of

Altoona.

At the age of 24 Samuel Vauclain was earning a decent salary and living with his wife in a newly constructed home outside of Altoona. Vauclain’s big opportunity came when he was offered a position as engine inspector for sixty locomotives being constructed at the Baldwin Locomotive Works in Philadelphia. Vauclain impressed the employers at the plant with his attention to detail. Thus, when a position fell vacant in 1883 for the general foreman of the 17th Street shops, Vauclain was offered the job. From that day in 1883 until the end of his life in 1940, Samuel Vauclain worked for the

Vauclain was asked to become a member of the board of directors.

During his early years at the Baldwin Locomotive Works Vauclain also engineered locomotive engine prototypes and first of a kind electrical machinery. He was one of the first men to apply to processes of heavy equipment and in 1889 Vauclain invented the compound



Early Vauclain compound locomotive.

Baldwin Locomotive Works Company.

Vauclain moved up the promotion ladder quickly at Baldwin Locomotive Works. He soon became Superintendent of the 17th Street Shops. Later he was hired as the Superintendent of Equipment, and by the age of 30 Vauclain was the General Superintendent of the Baldwin Locomotive Works. In January 1896

locomotive. Also in 1902, he performed developmental work on the balanced compound.

Vauclain’s hard-working attitude and inventive spirit earned him the position of Vice President in 1911. As V.P. and later Senior V.P. (1917), Vauclain was responsible for the sale of locomotive engines and

locomotive parts to Allied nations during World War I. His performance in Europe was exemplary and in May 1919 after Alba Johnson’s Death, Vauclain was appointed president of the Baldwin Locomotive Works. As president Vauclain continued to negotiate sales of locomotives with near-bankrupt European countries.

Continued on Page 6 - Vauclain

Marker Lights

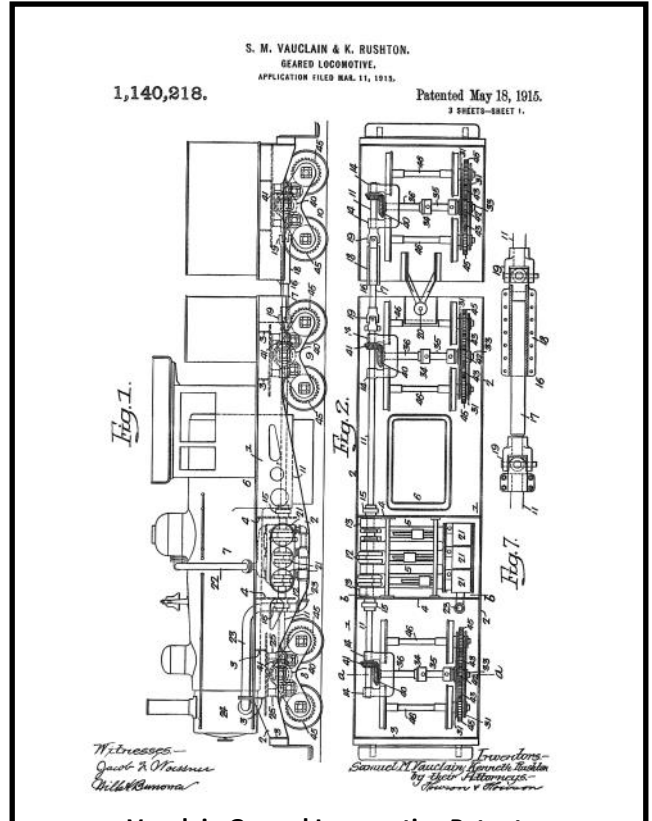
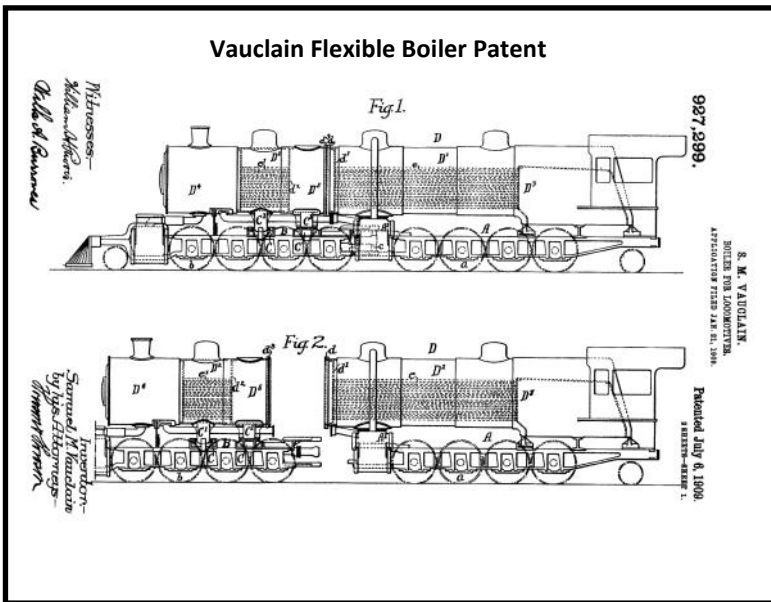


From Continued on Page 5 - **Vauclain**

By 1929 Vauclain had witnessed the construction of the 60,000-locomotive built by Baldwin. With the onset of the Great Depression he organized the cross-country trek of the "Prosperity Special." Nonetheless, with his wife's health ailing,

Vauclain decided to resign as President of the Baldwin Locomotive Works at the age of 73. He was appointed the Chairman of the Board and served in that position until his death in 1940. At the time of his death, Baldwin Loco-

otive Works was enjoying its most prosperous period. Just 16 years later all work was suspended.



Vauclain Geared Locomotive Patent

Wanted—Articles for the Carolina Conductor

Submit an article of 200 words or more with some photos and captions and see them in print. Every one of us has some unique railroad experience that would make interesting reading for our membership. With Jim Sheppard's passing your editor needs more contributions of local railway history and news.



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