

Carolina Conductor



Volume 5 Number 12

Monthly Newsletter of the Carolina Railroad Heritage Association, Inc.

December 2018

**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 Rwy Caboose #X3115:**
Spartanburg Amtrak Station
298 Magnolia Street
Spartanburg, SC 29301-2330
Wednesday 10-2 and Saturday 10-2

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Articles can be submitted anytime.

Climax Locomotive

Between 1875 and 1878, Charles Darwin Scott, a lumberman of considerable mechanical ingenuity, operated a logging tram road with a homemade locomotive to handle logs to the Scott and Akin mill at Spartansburg, nine miles from Corry, Pennsylvania. Scott's experiments with his homemade locomotive lead to his invention of the Climax locomotive.

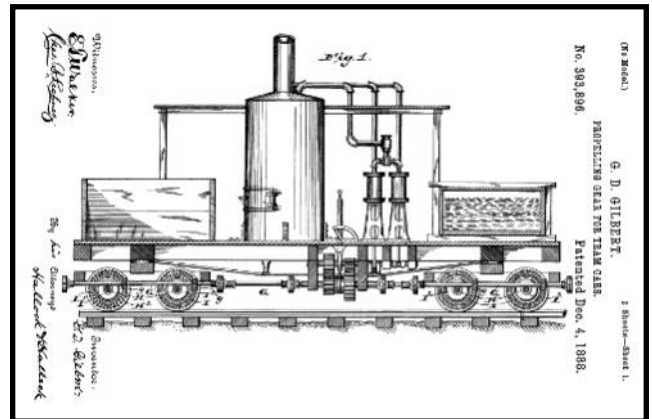
Scott decided to place his locomotive on the market and took his plans to the Climax Manufacturing Company in Corry to have the locomotive built. The first known Climax was out-shopped in March 1888 and was sold to the firm of Imel, Powers and Shank. Three more were built and sold within the next three months. A patent was applied for on February 10, 1888 and granted December 4, 1888, however, the patent was issued to George D. Gilbert instead of Scott.

George D. Gilbert was a relative of Scott



by marriage; was well educated and a civil engineer by trade. He had also been involved in the manufacture of portable steam engines. Scott had only a limited education and had agreed to let Gilbert draw the plans and handle the procedures of applying for the patent. However, Gilbert did not credit the invention in Scott's name.

When new patents were taken



1888 Gilbert patent for Climax loco.

Continued on Page 4 - Climax

Presidential Ramblings

PRESIDENT'S MESSAGE

November Meeting

The November meeting was held at the Woodmen of the World Lodge on Hwy 290 in Greer on 11-16-18. The topic for the night was Modeler's Night. We had several great models on display from N scale to a large wooden Piedmont & Northern diesel loco. Thanks to all who brought models and helped make the meeting a success.

December Meeting

The December 21 meeting will be held at 7:00 pm at the Woodmen of the World Lodge in Greer. This is our Holiday dinner meeting. Thanks to Donna Hopkins we will have ham as our main course. Please bring a side dish and/or dessert to share. Plates, utensils, cups, ice and drinks will be provided.

Calendar of Events

Mark your calendars for the following events:

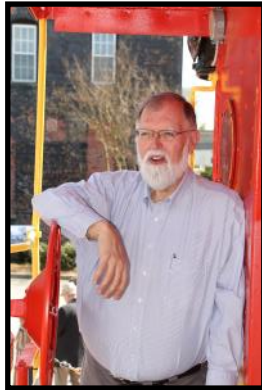
December 8, 2018 – Santa Train on the Greenville and Western Rwy.

December 15, 2018 – Santa at the Museum, 11:00 to 1:00.

December 21, 2018 – CRHA meeting at the Woodmen of the World Lodge, Greer at 7:00 pm.

January 7, 2019 – Board of Director's Meeting, Taylors Library, 6:30PM.

January 18, 2019 – CRHA meeting



at the Woodmen of the World Lodge.

January 19, 2019 – Train Show, Infinite Energy Center, Duluth, GA.

February 8 & 9, 2019 – Train Show in Easley, SC sponsored by the Central Historical & Model Railroad Association.

Caboose Renovation

The caboose renovation is continuing. The Caboose is not open to the public during the renovation. We hope to have it back into service as soon as possible, but it appears that this will not be a short-term situation. As we have worked on the renovation, we have discovered other structural and electrical issues that need to be addressed.

Thanks to Duane for all the time he has spent working in the Caboose. In the interim, please visit the Museum. The HO model train inventory has been relocated to the Museum lobby. We have established a GoFundMe account to help with the renovation costs and appreciate all donations that are being made.

Coloring Contest

The coloring contest winning entries are on display in the Museum. Stop by and check out the artwork by the young artists.

EBay Sales

EBay sales have continued to be positive. \$500 was transferred to our checking account in November. Thanks to Duane Heard for heading up this effort. Duane has decided to

cancel all EBay sales until after the first of the year. Items will be relisted after January 1, 2019.

Santa and Mrs. Claus

Santa and Mrs. Claus are scheduled to visit the Museum on December 15th from 11:00 to 1:00. Because of the Caboose renovation, Santa will be in the Museum this year. Mark your calendars so you won't miss this event. Candy canes will be handed out to all children who talk to Santa. We will also have warm cider and donuts for all visitors.

Arcadia Press Book Order

Arcadia Press is offering us discounts on their books if we order a minimum number. If you are interested in any Arcadia Press books, please contact Dave Winans and he will compile a list and place an order with them. All this is contingent upon having enough books to meet the minimum Arcadia Press requires.

Clinchfield Railroad Opportunity

Patrick Hill of Murrells Inlet has produced a number of items related to the Clinchfield No.1 locomotive. They include a Giclee print, a set of note cards and book by Mark Stevens. If you are interested in any of these items please check out their web site clinchfieldno1.com.

November Minutes

Approved November Board of Director's Minutes are attached.

Thanks,
Dave Winans
864-963-4739
dwinans4739@charter.net

Witticisms

Railroad President

At a station stop, the railroad's president walked up to the locomotive and spoke to the engineer. "You were going 65 mph and the speed limit is only 60 mph, I saw it myself on the speedometer in the business car!" After a heated exchange, the engineer finally said "You couldn't possibly have been going 65, my speedometer said 60 mph and we never saw you go by us!"

Railroad Tracks

Two drunks were walking upgrade between the railroad tracks. One of them said, "This is longest stairway I have ever been on." To this, the other replied, "It's not the stairs that bother me, it's the low banister."

Hotel Manager

A man and his wife check into a hotel. The husband wants to have a drink at the bar, but his wife is extremely tired so she decides to go on up to their room to rest. She lies down on the bed... just then, an elevated train passes by very close to the window and shakes the room so hard she's thrown out of the bed.

Thinking this must be a freak occurrence, she lies down once more. Again a train shakes the room so violently, she's pitched to the floor. Exasperated, she calls the front desk, asks for the manager. The manager says he'll be right up.

The manager is skeptical but the wife insists the story is true. "Look... lie here on the bed -- you'll be thrown right to the floor!" So he lies down next to the wife.

Just then the husband walks in. "What," he says, "are you doing here!" The manager calmly replies, "Would you believe I'm waiting for a train?"

Young Woman

In a train compartment, there are 3 men and a young woman. The four passengers join in conversation, which very soon turns to the erotic. Then, the young woman proposes, "If each of you will give me \$1.00, I will show you my legs."

The men, charmed by this young college girl, all pull

a buck out of their wallet. And then the girl pulls up her dress a bit to show her legs. Then she says, "If each of you gentlemen will give me \$10.00, I'll show you my thighs".

And men being what they are, they all pull out a ten dollar bill. The girl pulls up her dress all the way to her legs in full. Conversation continues, and the men, a bit excited, have all taken off their coats.

Then the young girl says, "If you will give me \$100, I will show you where I was operated on for appendicitis."

All three fork over the money. The girl then turned to the window and points outside at a building they're passing. "See there in the distance. That's the hospital where I had it done!"

Locomotive Theft

In the early 20th century, there were many coal mines in the Canadian Rockies, including some in what is now Banff National Park. On Saturday nights, many miners would ride into Banff and have a cup of tea or glass of lemonade, or just possibly, something stronger.

One Saturday, an inebriated miner missed the last train home. He wandered across to the yard, found an engine in steam, backed it out onto the main line, and drove it to his mine, stopped it, went to the bunk-house, and fell asleep. He was charged with "theft of a locomotive" by the Canadian Pacific Rly., but he couldn't remember a thing about it.

The trial went like this: Defense Counsel: Was the engine on CPR property before my client moved it? CPR: Yes. Def.: Was it on CPR tracks when he left it? CPR: Yes. Def: Did it at any time leave CPR tracks? CPR: No. Def: Then where is the theft? Magistrate: Case dismissed.

Q: Why is the railroad angry?

A: Because people are always crossing it!

Q: Why can't the engineer be electrocuted?

A: Because he's not a conductor!

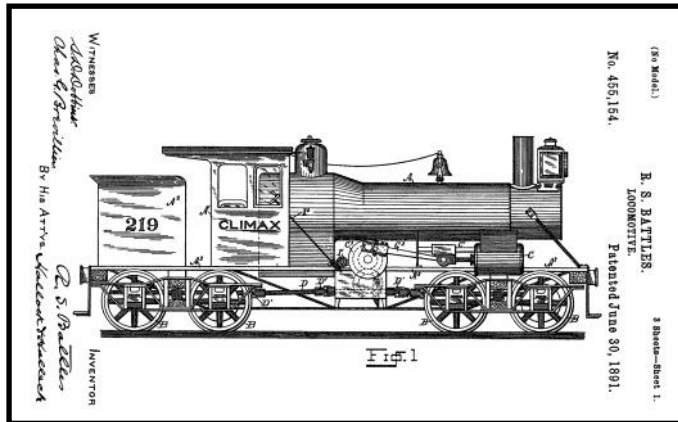
Wanted—Articles for the Carolina Conductor

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. Your editor always needs more contributions of local railway history and news.

Arrivals

Continued from Page 1 - *Climax*

out for design improvements by R. S. Battles of the Climax Manufacturing Company, Scott was again ignored. Scott filed suit against both Gilbert and Battles and ap-



Battles patent for upgraded Climax with horizontal cylinders.

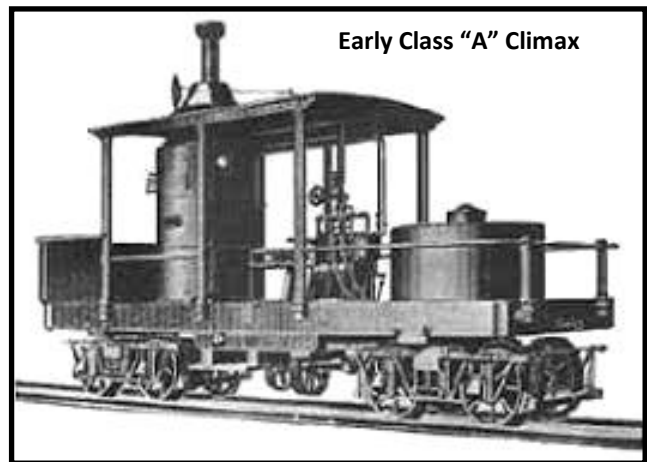
plied for a patent in his own name. After a lengthy court battle a verdict was rendered in Scott's favor and he was granted a patent on December 20, 1892. However, the lawsuit left him penniless and he never reaped much benefit from his invention and since the Climax name was applied to the locomotive, Charles D. Scott has been virtually forgotten. George D. Gilbert is still incorrectly credited as being the designer of the Climax in many publications and on some Web pages.

The first Climax Locomotives built were very crude in appearance and bore little resemblance to conventional locomotives. A vertical boiler and two cylinder marine type engine was mounted on top of a platform frame, supported by a four wheel truck at each end. A round water tank was placed on one end and a fuel bin on the other. Power was transmitted to the axles by gears with a differential arrangement similar to the modern automobile, and driven by a line shaft connected to the engine through a two speed gear box. The frame, canopy type cab, and even the truck frames were made of wood.

The idea of the differential gears was to reduce the resistance on sharp curves by allowing one wheel to be idle or revolve at less revolutions than the one on the opposite end of the axle. Several locomotives were built to this design, but it was soon found to be objectionable

in that it reduced the pulling power when negotiating sharp curves, especially on steep grades. This truck design was known as the "loose wheel arrangement". The first Climax locomotive weighed ten tons in working order and was soon increased to fifteen tons. It also set the pattern for the Class A type, which became so popular and was built until the plant went out of business.

The trucks were redesigned to eliminate the differen-



tial gears and bevel skew gears were substituted, with the wheels pressed tight on the axles. This was known as the "tight wheel arrangement". At the same time the truck frames were redesigned to a steel arch bar type with individual springs over each journal bearing, which allowed the axles to move up and down on rough track.

The most outstanding feature of the Class A Climax was the two speed gear arrangement connecting the engine to the longitudinal line shaft which in turn connected with the axles, centered between the wheels. These gears had two speeds, high and low, which could be shifted at will by the engineer in the cab. The low speed was a decided advantage when a heavy train had to be started on a grade, or when climbing a steep grade. The low speed gear ratio was 9:1 providing 13,200 pounds tractive effort and the high gear ratio was 4.5:1 resulting in 6,600 pounds tractive effort. They also had a neutral position which could be used to allow the locomotive to roll freely down grade by gravity. However, this was not recommended on steep grades.

A second feature was the simplicity of design which

Continued on Page 5 - *Climax*

Departures

Continued from Page 4 - *Climax*

made it possible to build the Class A and sell it at a cheap price. This also made the locomotive easy and cheap to maintain and operate. Woodsmen called it many names such as “Box Car Engine” because it resembled a box car, but a better term might be the “Poor Man’s Engine”. The Class A Climax was well liked by the crews because of its large roomy cab, which gave all the crew members a place to ride, out of the cold, wet weather.

The Class A locomotive had an operating speed of six to ten miles per hour depending on which gear was used. This was slower than the larger Class B and C Climax and other makes of geared locomotives but was ideal on poor track. All three classes of Climax Locomotives used the same type of trucks. The design used on the Climax truck was the most flexible ever used on any geared locomotive and the center drive allowed them to swivel freely and negotiate the sharpest of curves. The line shafts crossed the axles in the center and were held in place by cross boxes and bearings. This arrangement, plus the springs over each journal bearing, would allow the axles to move up and down on rough track without the slightest binding of the gears which always remained in perfect mesh.

The Class A locomotives were always small and were standardized in twelve, fifteen, eighteen and twenty-two tons sizes. Its combination of low speed and flexible trucks with its light weight, allowed it to run on the lightest rail and rough poorly constructed track with ease and haul a heavy load. In comparison with its weight, it was a very powerful little engine.

The appearance and appliances of individual Class

A locomotives varied considerably. The original open frame canopy style cab was often modified by the owner and was later changed to an enclosed cab by the manufacturer. A few were built with cabs that completely enclosed the locomotive. Larger capacity square water tanks could be ordered and in fact became the standard in the last years of production. Headlights could be any number and mounted in various locations. Bells were rare but were applied in several instances. The spark arrestors varied from a simple wire screen cage fastened on the top of the stack, to a distinctive Climax style diamond stack. Quite a few Class A locomotives had no spark arrestor at all.

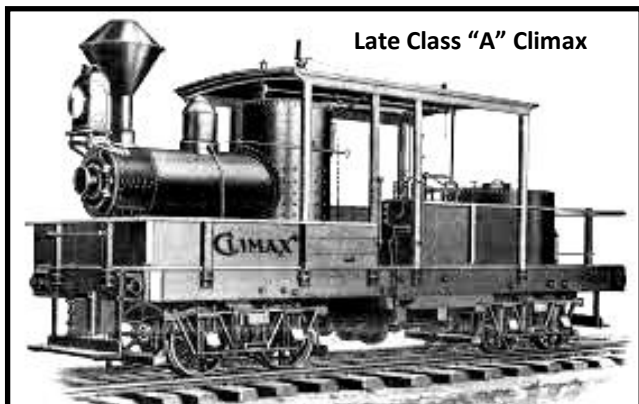
The Class A Climax was constantly improved over the years and the vertical boiler was eliminated. It was first replaced with a round fire box tee shaped boiler, then a square fire box tee boiler, followed later by a taper shell type boiler and finally a larger straight shell type. In 1911, the main frame was redesigned with steel and offered as an option. After it became available, only a limited number were built with wood frames. In 1916, the round water tank was replaced by a larger square water tank.

Wheels were available on the Climax locomotive for all applications. There was a wheel cast with grooves or cleats running across the tread and a deep flange for better traction on wood rail. There were wheels designed for use on a combination of wood and steel rails; concave shaped wheels with double flanges for use on track built from poles; and conventional steel tired wheels.

Climax Locomotives were built for track gauges ranging from 24 inches built for a Midwest contractor, up to 9 feet for a Class A locomotive built to operate on a Pole Road in Mississippi.

A small type A Climax was also designed which weighed seven to eight tons. It was basically like the larger engines except that it only had two axles and four driving wheels and did not have the speed gear shift. About four of them were built, but they did not prove successful because of being too light for most logging railroad operations.

The Climax was eminently successful from the very beginning. After the first engine was built, approximately forty locomotives were out-shopped during the



Late Class "A" Climax

Manifest

next three and a half years. However, there was an increasing demand for larger logging locomotives and it became necessary for Climax to design larger engines. While the Class A was very practical, the nature of its design was not suited for larger locomotives.

A larger Climax was designed with a horizontal boiler and with the cylinders arranged in a horizontal position. It also retained the proven Climax truck design, gear train and the two-speed gear shift feature. The new engine weighed twenty-eight tons, was designated Class B and resembled the conventional steam locomotive.

The first locomotive of this type (S/N 81) was outshopped in January, 1891 and was sold to Smith, Glover, and Duncan. A second engine was completed in February 1891 and shipped to North Carolina. A few others were built, but the design did not prove successful. The chief fault was that too many gears and other working parts were necessary to incorporate the two-speed gear shift feature. While the gear shift feature was a desirable and simple arrangement in the Class A, it was too complicated when adapted to the horizontal type engines.

A new Class B Climax was designed which eliminated the gear shift feature and changed the position of the cylinders to an approximate elevation of twenty-five degrees. The first locomotive of this design was built in 1893 and weighed twenty-five tons. It proved an instant success and was the beginning of the long line of Class B locomotives that proved so popular as long as the Climax locomotive was manufactured.

Soon after the first Class B was built, Climax de-

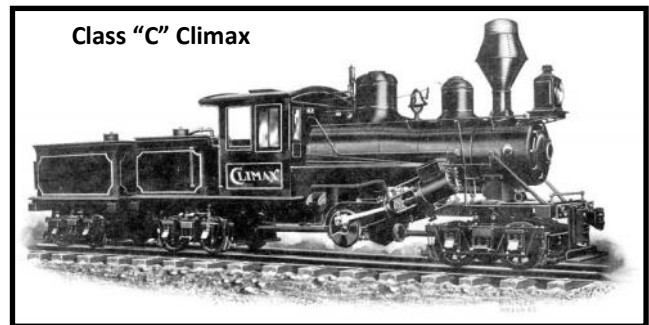


Class "B" Climax

signed and offered their locomotives in several sizes from seventeen to fifty tons. The small seventeen and twenty ton sizes had a tee shaped boiler with a round fire box, which in a few years was changed to a square

fire box. The larger sizes used a straight shell boiler for many years, then was changed to a taper shell wagon top boiler. Eventually the Class B was built in sizes ranging from seventeen to sixty-two tons.

The first Class C Climax built with three trucks and twelve drivers, was completed in 1897 and shipped to the Colorado and Northwestern Railroad. It was 36-



Class "C" Climax

inch gauge and weighed fifty tons. The three truck Climax gradually increased in weight to sixty and sixty-five tons and then to seventy-five and eighty-five tons. Eventually it became standardized in weights from seventy to one hundred tons.

From the beginning, Climax gradually improved their locomotives and added more sizes, which they continued to do as long as the locomotives were manufactured. Eventually the Climax Locomotives were offered in seventeen sizes, in weights from twelve to one-hundred tons.

In 1910, Climax reclassified the sizes of the locomotives to conform with new improvements being made. At this time all straight shell boilers were replaced with taper shell, wagon top type boilers; except the Class A and twenty ton Class B engines. Until this time all cabs were of wood, but now, steel cabs were offered as an option. They became so popular that wood cabs were seldom used after this date; except on the Class A, that was always built with a wood cab.

Until 1915, all Climax Locomotives used the Stephenson valve gear. At this time, it was replaced by the Walschaert valve gear on all sizes of forty-five tons and larger. This proved to be a decided improvement and had the advantage of all the working parts being on the outside of the locomotive and easy to maintain. The Walschaert valve gear was also less likely to get out of

Continued on Page 7 - Climax

Rare Mileage

Continued from Page 6 - *Climax*

adjustment and had less wearing of the working parts, resulting in less maintenance.



Walschaert valve geared class B Climax.

In 1922, Climax designed a one-hundred ton, three truck locomotive, which was out-shopped in July, 1923. At the same time, the sixty ton Class B and all Class C locomotives were upgraded with many new features. The main frames were strengthened, and many large castings formerly made of cast iron, were now cast from steel. Piston valves replaced the old slide valves and superheaters were added as an optional feature.

Again in 1925 more improvements were made. The main frame was again strengthened by a girder type frame which eliminated truss rods. The engine frames were redesigned with alligator type cross heads and cast from steel. Cast steel truck frames replaced the arch bar type frames. All weather vestibule cabs replaced the open cabs on all Class C locomotives. This was the first of the improved geared engines offered to the lumbermen and preceded the West Coast Special Heisler and the Pacific Coast Shay by several years.

Climax also built a line of logging cars for many years. Many orders for a locomotive often included several logging cars. Before they began building locomotives, the company had long been engaged in the manufacture of mowers and reapers, stationary steam engines, oil well equipment and other products. However, locomotive production soon reached the point that it taxed the capacity of the plant and all other products were

dropped.

During a period of over forty years, Climax built between 1,030 and 1,060 locomotives. They were widely distributed and popular in the lumbering regions throughout the United States and Canada. Many were also exported to foreign countries. They were also much used on mining, industrial switching, plantations, brick yards, short lines and many other specialized railroad uses.

It is difficult to accurately determine the total number of locomotives constructed by Climax due to the assignment of shop numbers and the lack of complete shop records. The assignment of shop numbers was unique, to say the least. Numbers from 1 to 250 or 300 were assigned consecutively. From 250 or 300 through 499, only the odd numbers were used and from 500 through 1000 only even numbers were used. Between 1001 and about 1585 only odd numbers were used, and from 1586 through 1694 all numbers were used except for a few around 1690. 1694 was the highest shop number ever used.

Sometime after 1900 the use of numerical order was discontinued. A batch of builders' plates would be cast at one time and placed in a bin. When a locomotive was ready for the builder's plates, or plate in the case of the Class A, the first single or matching pair found would be placed on the locomotive. Sometimes plates would be placed on a locomotive boiler on which production was delayed for an extended time or which was built for stock and not sold immediately. This would result in locomotives that appear to be "early" production models often being delivered after "later" production models.

During the latter half of the 1920's, the demand for new geared logging locomotives had shrunk to a small portion of what it had been in former years. At this time the owners of the Climax plant were well advanced in years. This and the limited sale of new locomotives induced the owners to sell the business in September 1928, to the General Parts Corporation. This company had been engaged in purchasing defunct automobile companies and providing a repair parts service. This was also their reason for acquiring the Climax business and they had no intention of continuing to manufacture the

Continued on Page 8 - *Climax*

Marker Lights



Continued from Page 7 - *Climax*

locomotive. The only new locomotives they sold after acquiring the plant were two engines completed for stock and four others under construction, which they completed and sold. Others under construction which were partially completed were dismantled for their parts.

General Parts Corporation continued the repair parts service for several years. Later the plant buildings and machinery were sold to others and part of the plant was torn down to make way for a new building to manufacture war material during the Second World War.

Over the years, many inaccuracies about the Climax locomotive have been published in books and articles pertaining to both logging railroads and geared locomotives. These inaccuracies are often the result of over-enthusiastic rail-fans - intrigued by the design of the Shay locomotive - rather than in mechanical design and performance. For example - because of the drive-line arrangement of the Shay, the trucks were sprung on only one side - and thus were prone to derail on the rougher track of the smaller logging operations; whereas the Climax and Heisler locomotives with their fully sprung trucks, could handle the roughest track without derailing or losing tractive effort.

It has often been stated that the Climax was invented as an attempt to improve upon the Shay locomotive. This was hardly the case as development of both locomotives occurred during roughly the same time frame and at locations hundreds of miles apart. It is doubtful that either inventor knew of the others work until after both locomotives were placed on the market.

Experiments by Ephraim Shay and Charles Scott quickly lead both men to realize that a successful logging locomotive had to be as flexible as a loaded log car. However, Shay's design was built to fit existing parts from a wrecked barge, resulting in its odd offset design, while Scott's locomotive was designed from the rail up to have an even centered power distribution.

An often-quoted misconception about the Class B and C Climax Locomotives is that the flywheels that transmitted power to the line shafts resulted in a vibration that would cause damage to the locomotive.

The larger Class C locomotives with their larger and heavier parts did create a problem for counterbalancing for more than one speed of the locomotive and resulted in vibration of the crankshaft. The shake was not materially transmitted to the trucks because of their extensive springing and so proved far more uncomfortable than dangerous or damaging. Improvements to the Class C Climax in 1928, virtually eliminated this vibration.

The lesser weight of the parts on the smaller locomotives did not create the centrifugal forces that arose on the large engines so that their counterbalancing was not difficult, and the vibration was never a problem for these locomotives.

Another misconception often perpetuated by the authors of these publications is that the Climax locomotive was not as popular as the Shay or other geared locomotives because of the number produced and/or that the Climax was somehow inferior to the competition. The Climax was extremely popular.

This is the end of the locomotive builder series for now. Ed.



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CAROLINA CONDUCTOR



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