MLS MasterClass Mini - 2005

"THE SINGLES"
Build a Classic American 4-2-4T Locomotive

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All Colour Photography by David Fletcher

MasterClass Mini 2005
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Chapter 1 - Getting Started
Background

We're back and its time to step things up…!

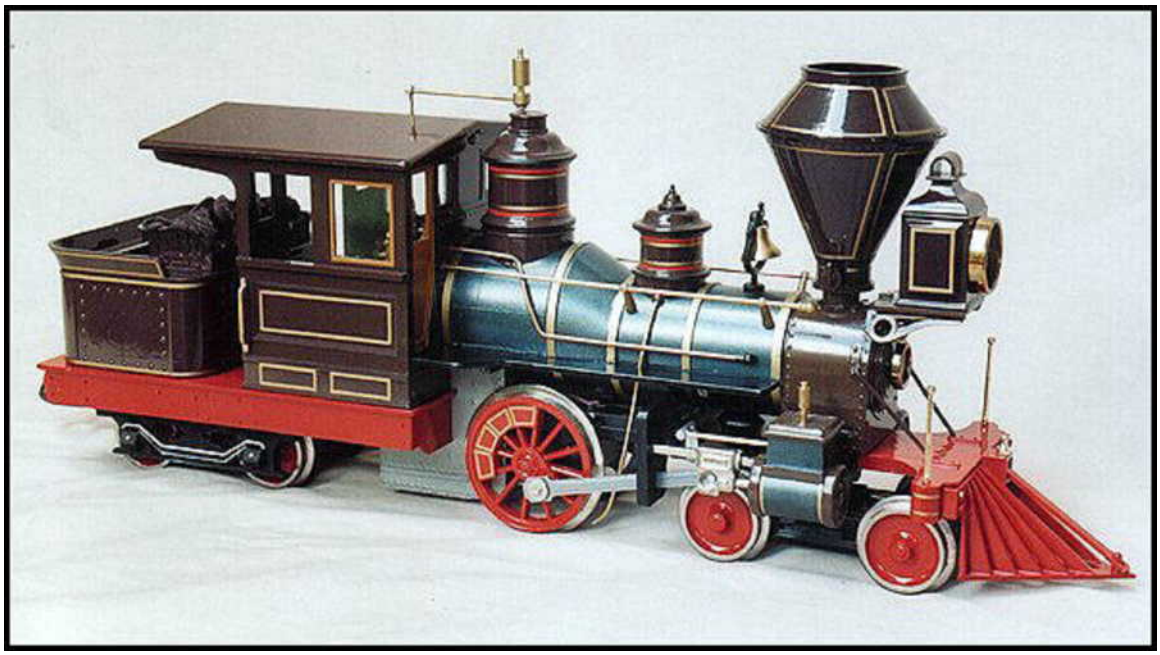
Frequenters of this fine site, we are about to launch into the historical background and model building of a locomotive called a 'Single'! The 'Single' is the generic name for a locomotive with only one driven axle. They would earn more nicknames than most other classes of locomotive, including 'The Bicycle type', 'One Armed Bandits', 'Spinners', 'Pony' and 'One Armed Billy' to name a few.

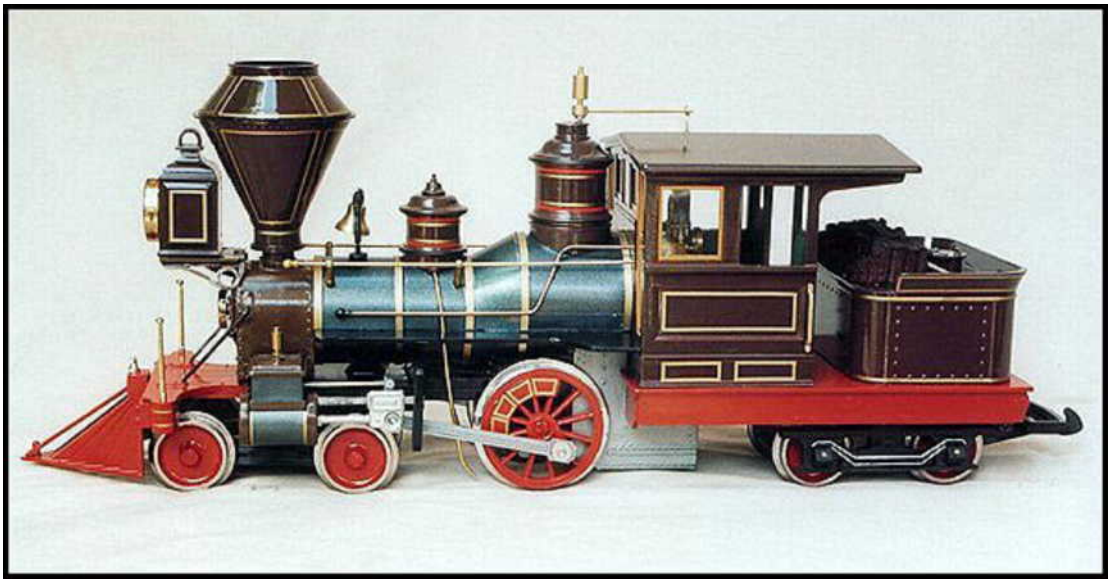
Under the Whyte classification system, names have later been associated with the wheel classifications, based on locomotive names, locations and builders that originally used that particular wheel arrangement. The 2-2-0s have been called *'Planet'* after the early Robert Stephenson *'Planet'* type locos. 2-2-2s have acquired the actual name *'Single'*, 4-2-0 are called the *'Jervis'* class, named after the engineer who developed that wheel arrangement for the rough trackage in the US. The 4-2-2 were called the *'Bicycle'* type. Unlike other classes of locomotive, the names associated with wheel arrangements for the single axle types were adopted well after the fall of this type. After all, the Whyte classification system was only widely adopted after 1900. For this reason, both in the US and UK, the generic name for locomotive types with only one driven axle remain simply *'Single.'*

The Single held a special place in the development of the steam locomotive in both the US and UK in the pursuit of speed. The most common misconception about the Single is that they were incredibly antique and the earliest of locomotive design, nothing could be further from the truth, but we'll get to that in the Background section.

The model we'll be building is generically based on the 1863 Collis P. Huntington, a small and beautiful 4-2-4T now preserved at the California State R.R. Museum in Sacramento, California. However the model will be freelance, to a scale nom. 1:20.3, narrow gauge. You can adjust, change, and enhance the model as you please. Unlike previous MasterClasses, this class is about Basic Kit-bashing, and as such the major components of the model will be provided to you in the form of a *'kit.'* We are very pleased to have the support of **Phil Jensen** of **Hartland Locomotive Works,** as designer and supplier of the parts to be used, as well as his many years of experience in model building. This is not to say the 4-2-4T model will be drop dead easy, it wont be, however you will not be scratch building cabs, tenders, domes, stacks, headlight etc, these are already made for you, and do not require much alteration, if any. The model will require you to scratch build a boiler and elements of the chassis only. These are not of particular difficulty, and gaining some understanding and experience in those two areas will enable you to broaden your kit-bashing potential for the future.

If you follow the instructions to your heart's content, this is the locomotive you'll be building:





The parts you will be fabricating yourself are the boiler tube and chassis, from the drive wheel to the tender deck. Everything else you see in this model will be supplied in the Hartland kit.

There will be only two chapters in this series; both shall have a *Background* and *Construction* sections, typical of the MLS MasterClass Format.

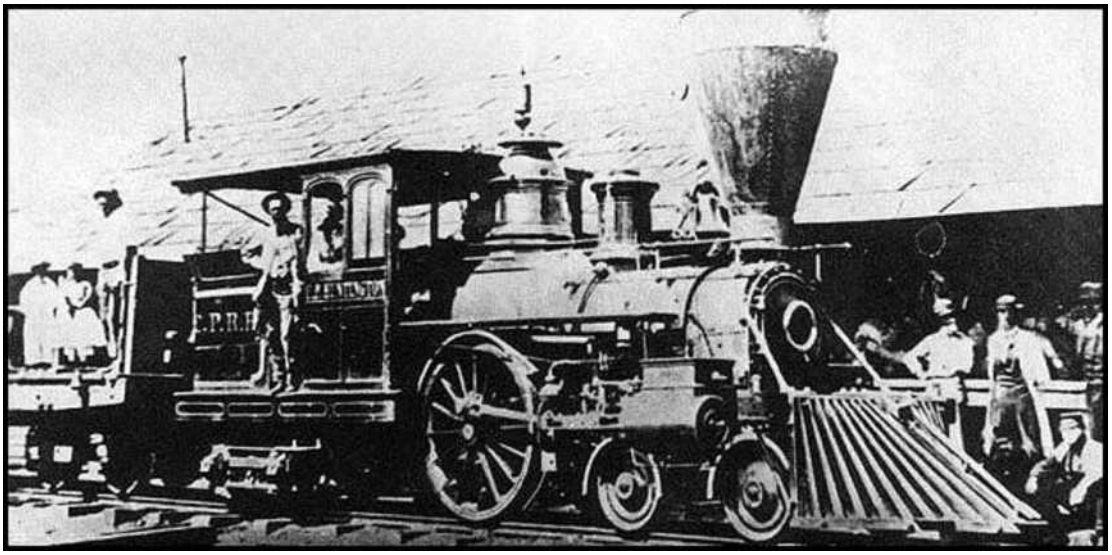
- **Background:** Discover the reasoning behind the 'Single', and their remarkable successes and failures.
- **Construction:** We'll be building the chassis of the locomotive in this chapter.

Options:

As always with my MasterClasses, there is more than one option to build... hey why not build them all!!

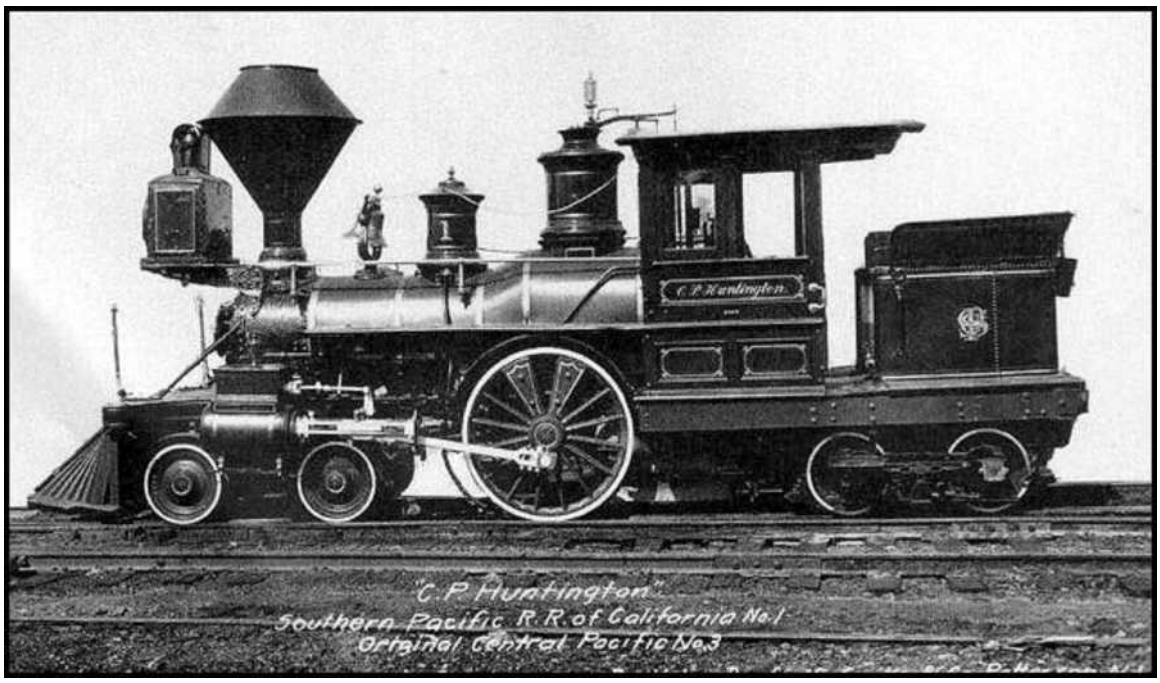
The 1863 version 4-2-4T:

Build the 4-2-4T loco to the original styling of the CP Huntington before the 1890s rebuild. This loco featured arched cab windows, extended roof canopy over the coalbunker, a polished brass steam dome, and no headlight. You can follow the PDF's from the standard construction, just making the minor alterations as required.



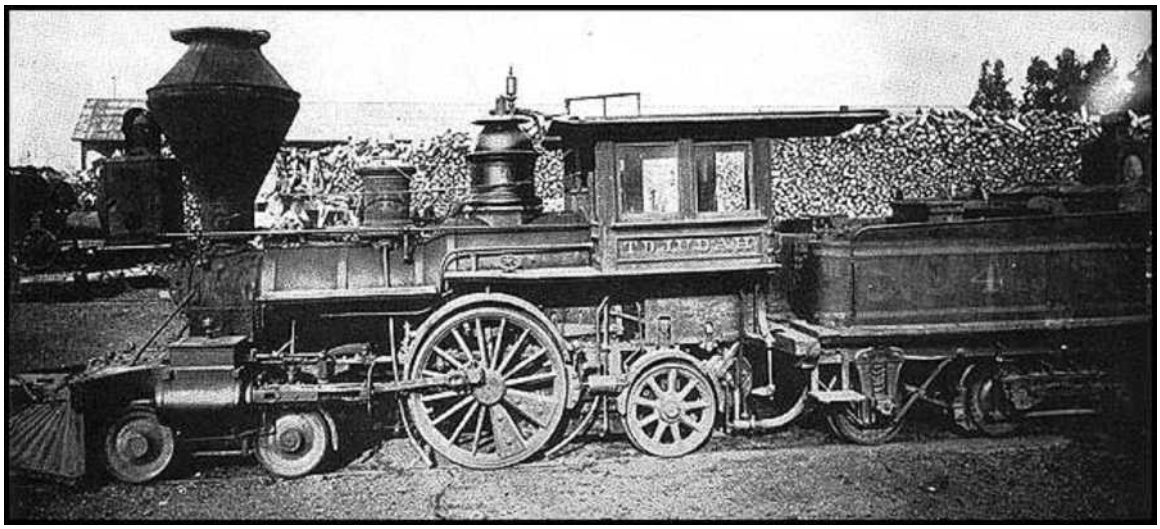
The 1880s Rebuild:

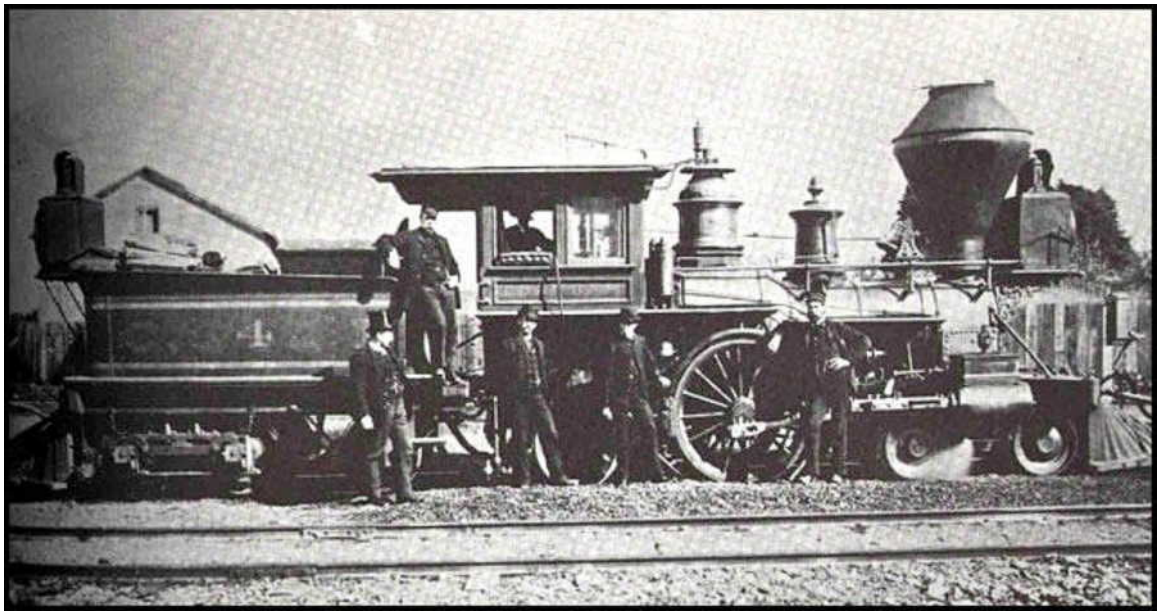
This is the popular version, featuring locomotive styling of the 1870s. The CPH was rebuilt by Master Mechanic A. J. Stevens of the Central Pacific R.R. after a wreck in the 1880s. The CPH retains this styling today. The Mini-class shows the building of this version.



The TD Judah 4-2-2 Tender loco:

With a view to increasing the operational range of the 4-2-4T design, TD Judah, an identical 4-2-4T to the CPH was rebuilt as a 4-2-2 tender loco, featuring a cute lil 6 wheel tender. The constructional differences from the CPH are minor. PDF's for the different components are provided in the class for a loco based on the TD Judah.





Some Inspiration:

I can't understand it. Why is this so... I just keep revisiting prototypes that Delton locomotive works had made in the 1980s! Mason Bogies, CP Huntington and C-16s!

In 1983 Delton entered the model train limited edition brass market with the superb 2-6-6T Mason Bogie *'Breckenridge.'* In 1987, they produced a beautiful model of the CP Huntington, of brass construction to a scale of 1:24. Not much to say except WOW. These old models are never far from my thoughts, and while I probably will never own one, nor even touch one; I cannot help by be inspired! Be inspired, be VERY inspired! (Sorry Chris I nicked that one from you!).

Delton's CP Huntington:

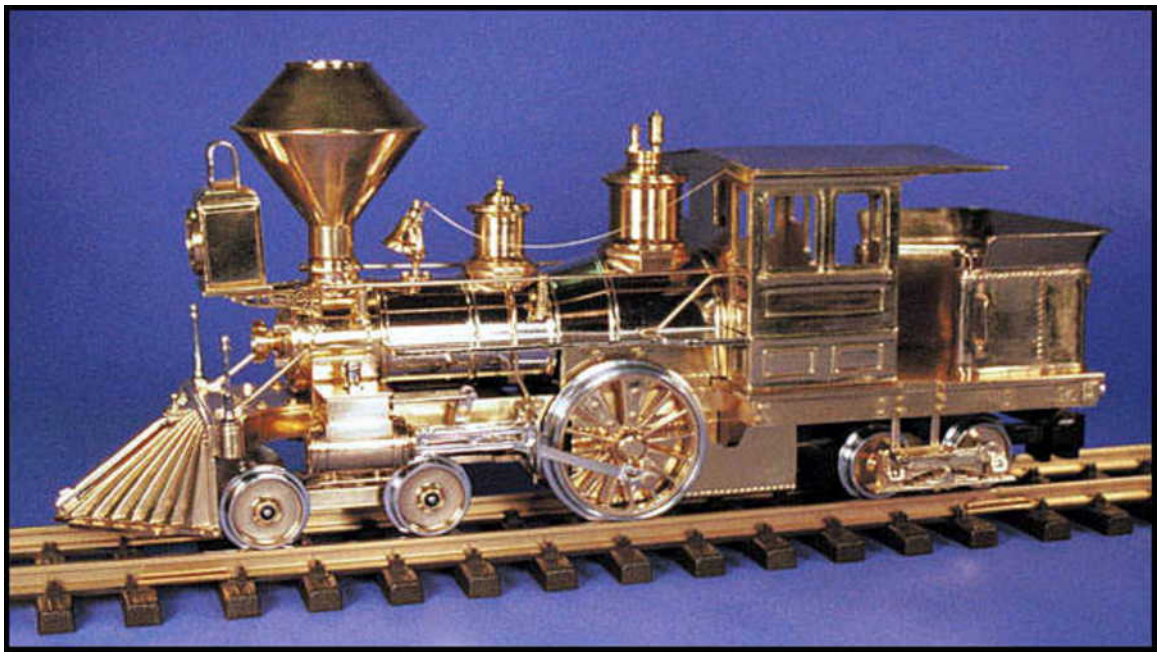
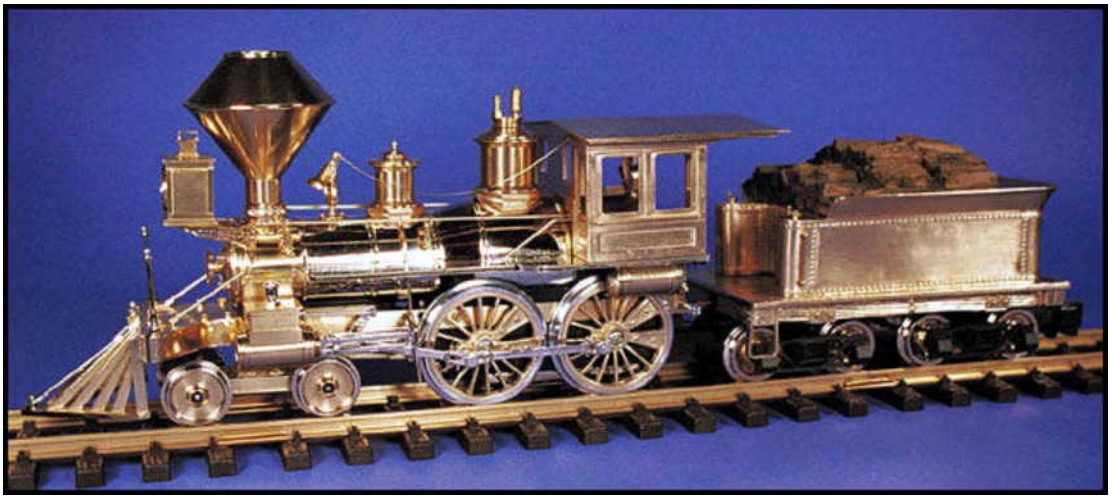
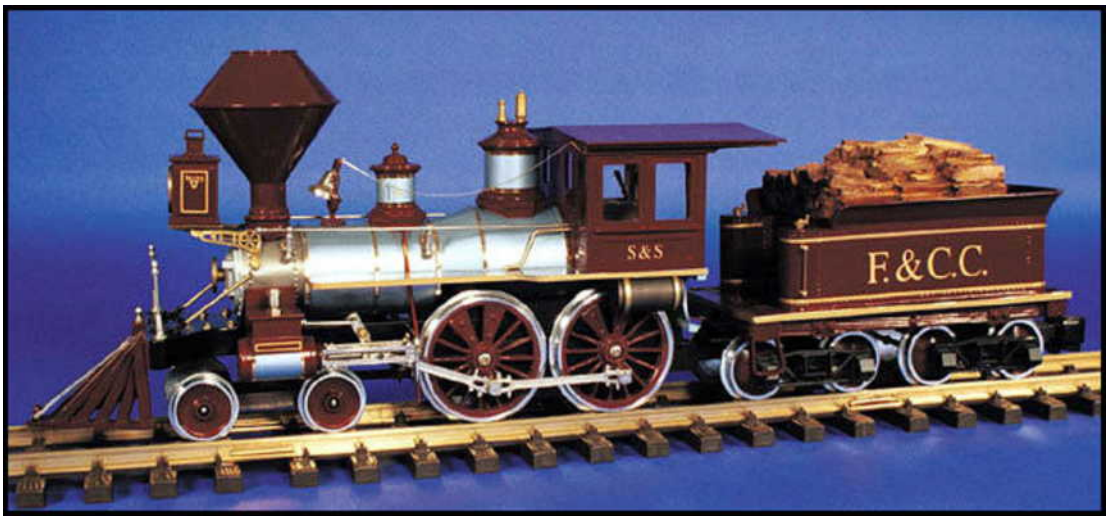


Photo courtesy of Lenny Sloboda.

Delton also used their CPH patterns and tooling to produce a neat old time freelance 4-4-0 in 1987:

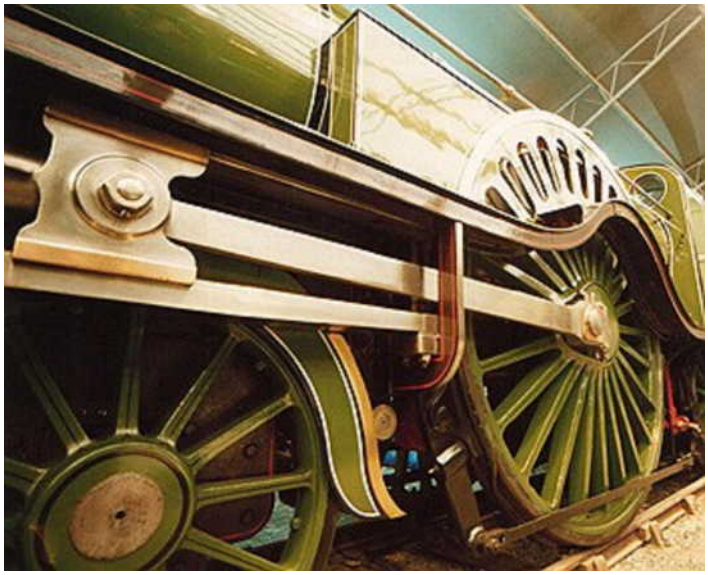




Above photos courtesy Lenny Sloboda.

The 4-4-0 version is also a possibility from this Mini-class. While I wont produce PDF's specifically, this locomotive would only be a little bit of extra work for a kit-bashers who has done some loco building before.

So lets do it!



The Singles - In the Pursuit of Speed

In the Beginning:

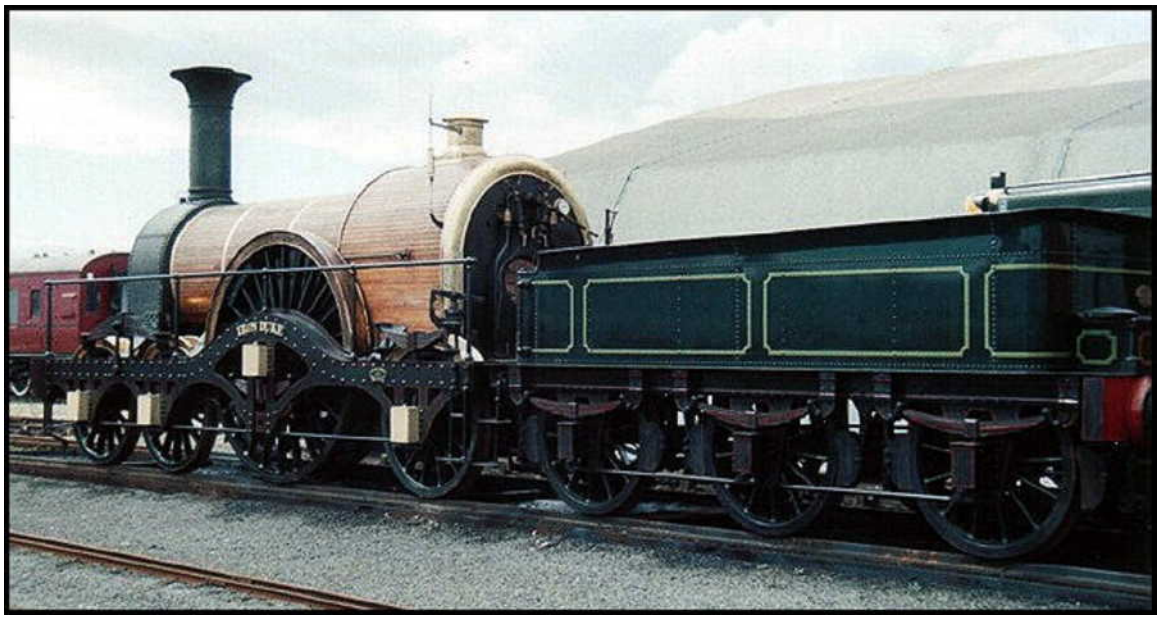
It is true; many of the earliest locomotives were *'Singles'* in that they had only the one powered axle. But be aware, many of the earliest locomotives had multiple powered axles, including the very first steam locomotive in history, the 0-4-0 built by Richard Trevithick in 1804. Design simplicity, strength and stability were reasons why early designers often fell toward the *'Single'* - the 1829 0-2-2, *'Rocket'* built by Robert Stephenson was one such example that won the Rainhill Trials. By the 1840s, it would seem the day of the *'Single'* was over. Locomotive progress would leave the *'Single'* behind as just a developmental chapter.

But then something happened, a developmental deviation from mainstream locomotive design occurred and the *'Single'* made a heroic comeback. Their glory days would be the 1870s-1880s, but in the UK, some would be retained well into the 1920s. I don't know who it was that saw the potential of the *'Single'* in the development of a speedy locomotive, but some signs point to Daniel Gooch of the Great Western Railway (GWR), and his collaboration with the great British Engineer, my Hero, Isambard Kingdom Brunel, chief engineer of the GWR. To read more about Brunel and the GWR, please do refer back to the *'Background'* section of MasterClass 2001, Chapter 8.

Brunel's engineering work was never based on pre-existing assumptions. He nearly always would re-think a design concept from first principles for the purposes of extracting the most efficient and beneficial outcomes for his sponsors. So it was that in the 1830s Brunel proposed a seemingly ridiculous broad gauge of a whopping 7 ft. 1/2 in. for the new GWR. Brunel may have bankrupted many of his sponsors in pursuit of perfect engineering solutions, but his reasoning could never be faulted. The Broad gauge of the GWR had been based on considerable calculation, taking into account the route, levels, curves, the economics of materials and delivery, and the loading gauge of rolling stock and locomotives. Brunel had only one purpose for all this - the development of the fastest, and smoothest ride in the history of travel. The conclusion of the 7 ft. 1/2 in. gauge would provide extraordinary flexibility for locomotive design. Brunel was right, and later the world's fastest machines of the 1800s would grace the rails of the GWR.

Brunel however was initially disappointed with the lack of speed attained on his GWR, and believed unsuitable locomotives to be the problem. Appointed as chief locomotive engineer of the GWR in 1837, Daniel Gooch would design locomotives that exploited every last inch of that loading gauge in the pursuit of speed and stability. In 1840 Daniel Gooch's *'Firefly'* class locomotives, a 2-2-2 *'Single'* entered service, and over night Brunel's Broad gauge concept was proven. Attaining speeds above 50MPH, the *'Single'* with a very large driving wheel diameter was proving its worth. The fastest of the class, the *'Great Western'* broke its lead axle in 1846. Gooch attributed the failure to the uneven weight distribution over the drivers, and the pounding of the lead axle into the curves. He rebuilt the *'Great Western'* into a 4-2-2, and in doing so, paved the way for the rebirth of the *'Single'* as the primary source of speed. Gooch's locomotives were elevated to the forefront of locomotive development in the world.

From the failure and rebuilding of the 2-2-2 *'Great Western'*, evolved Gooch's *'Iron Duke'* class, a high speed *'Single'* of 4-2-2 configuration. 29 of the class would be built between 1847 and 1855. On the 11th May 1848, the *'Iron Duke'* class *'Great Britain'* attained the world land speed record at just over 78MPH... having beaten its own earlier record!! The world took notice of the extraordinary achievements on the GWR, and the *'Single'* was back!



Daniel Gooch's Iron Duke Class - 78MPH in 1848.

The success of the design was based on a number of basic principles:

The very large *'single'* driving wheels allow the loco to travel great distance with just one piston stoke. The *'Iron Duke'* class had an 8 ft. drive wheel, - think about that, 96" of wheel diameter equates to 25 feet of travel with just one full stroke (back and forth) of the piston.

The distribution of weight, the careful balancing of the loco allowed the maximum weight over the drivers to enable the *'Single'* to maintain good adhesion, something that had previously plagued the *'Singles'* in the early years.

The placement of support wheels about the massive drive wheels allowed for stability at speed, with the 4 leading wheels restricting the side-to-side sway and the trailing wheel providing for a large firebox behind the drive wheels, which equated to better steaming capability.

With such notable worldwide interest in the design, others would follow, and so begins the slight deviation in locomotive development, the Singles - in the pursuit of speed.

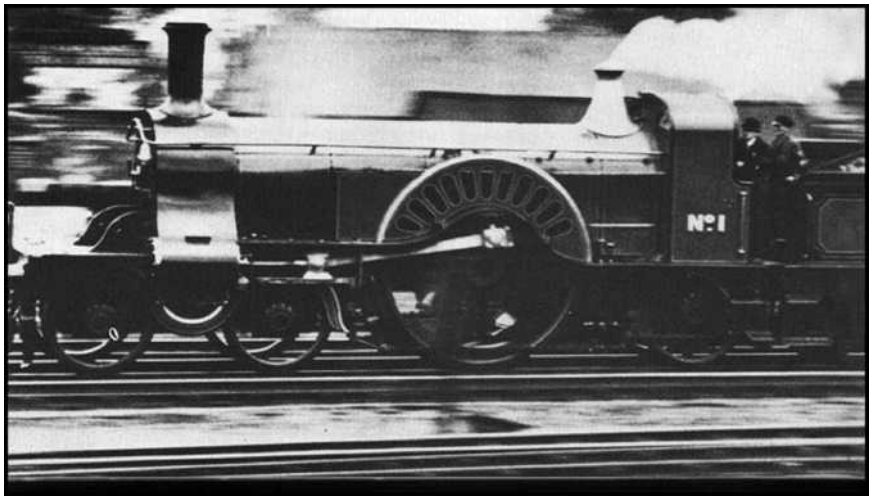
Historically the most famous *'Singles'* would be found in the UK. Here speed and sleek design would meld into some of the most beautiful locomotives to ride the rails. So lets look a little further into the UK, before looking at US examples.

Patrick Stirling's 8 ft Single of the Great Northern Railway - 1870-1895:

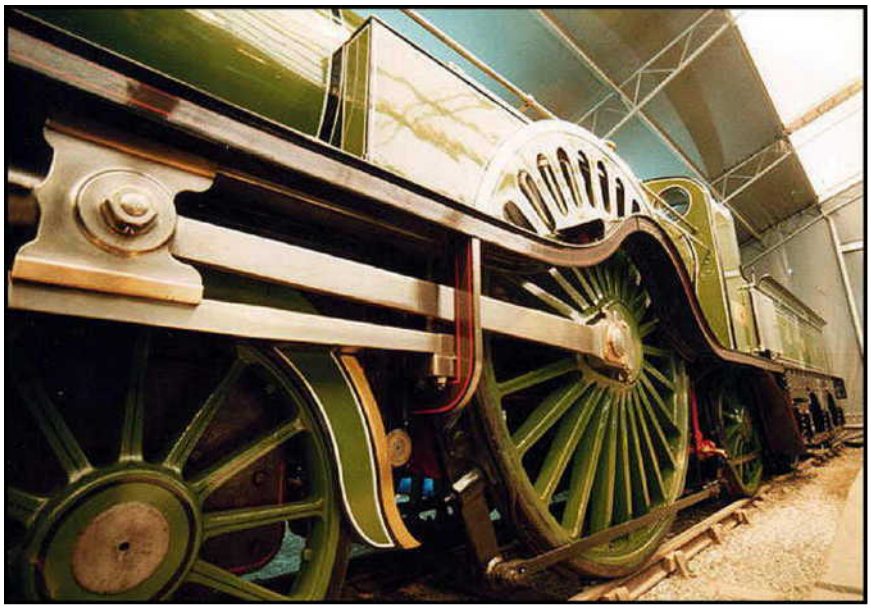
When one mentions the name 'Single', it is Stirling's Single that immediately comes to my mind. Those that know me, know I love just about anything that runs on steam! However, if someone were to ask me which locomotive of all the world I considered my favorite, it would surprise you to learn the locomotive is British and is a Single - the Stirling Single. I first saw the locomotive as a 6 year old in 1973, while visiting the National Railway Museum, York UK. It was probably fitting that my first impression of the loco at such a young age was derived from the real locomotive standing before me, rather than from a picture in a book. Photographs simply cannot do justice to such magnificence. Here it is, Patrick Stirling's 8 ft Single:

Just take some time to look her over, every joint is perfection, every curve leads the eye over and around the machine. Note how the pilot truck fenders flow with the wheel curvature, how the smokebox, cylinders and stack flow into one. How the boiler is perfectly straight, leading to the magnificent steam dome cluster, of conical brass. The crossheads and guides meld into the running boards, and all the various elemental heights just relate perfectly. The cab of curved iron flows about the boiler and is more a windshield than enclosed cab. Run your eye along the running boards; note the deliberate curve over the drive wheel, allowing for the crank throw to pass. Look at the paddle wheel like drive wheel enclosure, with elongated openings. What Beauty.

Beauty aside, this machine was most deliberately designed for speed:



How the machine thrives when it is doing what it was designed to do. The locomotive is not meant to be a static sculpture. Look how the wheel spokes vanish at speed and the loco floats over the rails.



Stirling's Single was based on the design concepts that came from the Iron Duke; the balancing is the same, the 8 ft. 1 in. drive wheel is close, and the firebox between the driver and rear axle provide for a larger firebox grate area. But Stirling did something not commonly done in the UK in the 1870s, the use of external cylinders and rods. Most British locomotives of this era, like the Iron Duke had internal cylinders. The theory behind this was that the powerful stoke of the pistons generate a longitudinal pounding on the loco frame. This in turn tends to make the loco yaw in a side-to side motion over the rails, or 'hunt'. To minimize this effect, engineers placed the pistons as close as possible to the centreline of the locomotive, down the centreline between the rails. As such, external cylinders were deemed to cause rough riding, which only became worse at speed. Stirling however also believed center-of-gravity influenced locomotive stability, and thus the lower the boiler sat above the rails, the more the lurching would be minimized. In order to build a 'Single' with the largest drive wheel, and a large boiler above to power it and use internal cylinders, the boiler height would be determined by the height of the crank throw between the frames on the drive axle. This would lift the boiler a good 2 ft above the axle. Added height raises the center of gravity and hence decreases stability. So Stirling went the other way, external cylinders with the boiler only inches above the drive axle and a crank throw that reaches well above the boiler base. The 'hunting' effect or side-to-side motion of the Single is reduced by the use of the 4 wheel pilot truck.

The Stirling Singles would prove there worth; 53 of the class, with variations, built between 1870 and 1895. They had 11,000 lbs tractive effort, with speeds up to 85mph. They became the locomotive of choice for the crack London to Edinburgh express, that would later be known as the 'Flying Scotsman'. Used well into the 1900s, all were finally scrapped by 1916, except the class leader, #1, now preserved at York. Superseded by conventional locomotive design, the reality is this type of 'Single' provided the principles behind the racehorses that would follow, the Atlantics and Pacifics. In the UK, this would be topped off by Sir Nigel Gresley's A4 class 4-6-2 'Mallard' that took out the steam speed record in 1938, at 125mph, a record she retains to this day. Both the Stirlings and the Gresleys were built for the same railway, in the same Doncaster workshops. The Railway would become known as the London, North Eastern Railway (LNER).

You'll note the two very different museum environments shown in these photos. Some were taken in 1991, while the York Museum was having a new roof installed on the main museum complex. All the famous locos were moved out into a tent like annex for a year. This was actually pretty good, as lighting was much better. In 1992, the locomotives were moved back inside the museum, with an all-new roof - these are the other photos you see.

The Last of the British Singles:

The Midland Railway Class 115 4-2-2, 1896:

In the late 1880s when the era of the 'Single' was coming to and end, Midland Railway Engineer, Samuel Johnson decided to have one last crack at the speedy loco design. It had been 20 years since the Midland Railway had last built a Single, but a change in Midland railway management policy and the development of the rail sanding device brought the Single back for one last laugh. The Midland thinking had shifted to smaller, efficient locomotives, hauling lighter trains at greater speeds, and so in 1887, Johnson began a new line of 'Single', or Johnson 'Spinner' as they became known. The Johnson Single would also be the last used in regular service in UK, well into the 1920s. The last and greatest of the Johnson Spinners was the class 115, of which 15 were built between 1896 and 1899, they were an inside cylinder design, but had smaller drive wheels than the Stirling, at 7 ft. 9.5 in. The class 115 reaffirmed the policy of the Midland, that small was beautiful, and indeed the Johnson's were beautiful. These graceful machines were known to commonly pace out to 90mph towing 350tons of train.

Only one of the Johnson *'Spinners'* has survived, also preserved at York, Midland class 115, #673. This graceful 4-2-2 design resides as part of the museum days of travel display, and is not displayed in the main locomotive hall. Note the classic Midland red paint scheme.

Ultimately the downfall of the 'Single' in Britain was due to the large wheel, vs lower tractive effort. The fact that the boiler would always ride high over that drive axle, and thus there was deemed to be a limit to which an efficient 'Single' could be built in a world where locomotive design was pushing for larger machines.

Few conventional locomotives in the big steam days that followed would have wheels quite as large as those of the 'Single'. The fast steam of the US and UK would have drive wheels topping at the 80" or 6-7 ft range.

Some Inspiration:

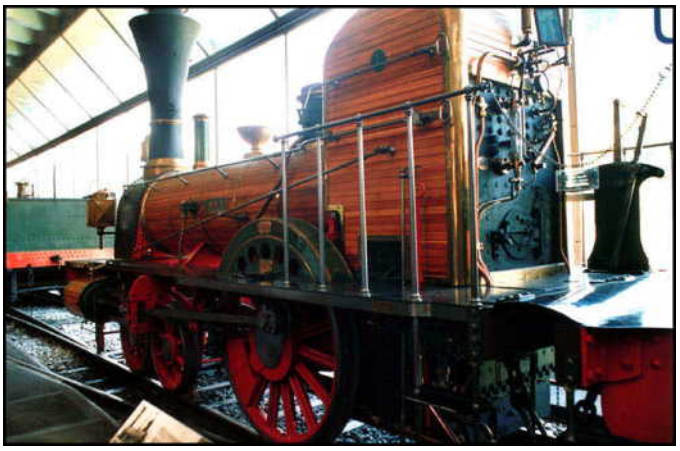
Not long after I saw that Stirling Single in 1973, I acquired an aging and battered book about model railways, published in 1960. The book's info is probably mostly outdated now, but in there was an old photo that always fascinated me, and perhaps to some extent, I wanted to be like the kid in the photo. Teenager Tony Appleby of Westcliff-on-Sea scratch building a live steam Stirling Single. Here he is, building a Masterpiece as a kid! Man I've not even tried to build the Stirling. It would not be easy to do.

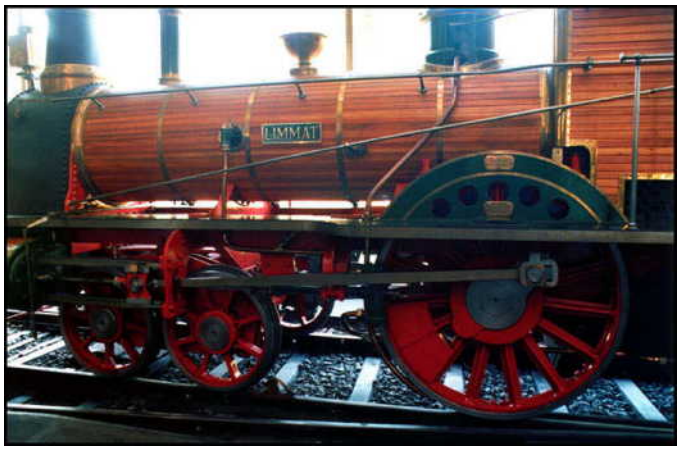
The Single in the US:

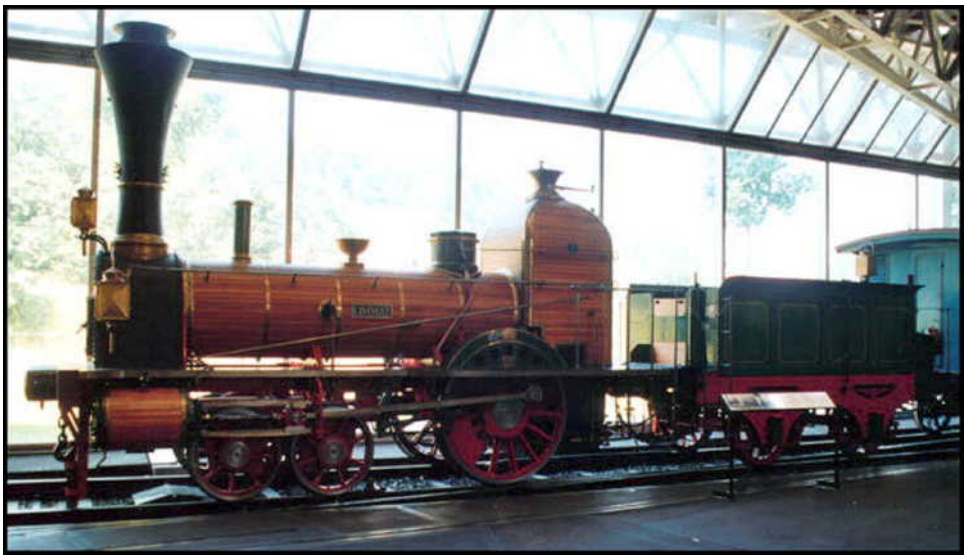
1927 replica of the B&O 1837 Norris 4-2-0, Lafayette. Note the Bury 'Coppernob' boiler, Bury firebox slung behind the driving wheels and the Jervis 4 wheel pilot truck. This is a picture of 3-point suspension. B&O Museum, Mt Clare, Baltimore, USA. (notes taken from MC2001, CH3).

The Story of the Single in the US would be quite different from the UK, and from the outset, I can state that the Single never found favor among the US railroads as a means of acquiring fast locomotive designs, although there was a brief period of racy US singles. There is no question that the Single played a major role in developing a reliable running loco during the early years - 1830-40. Rough track work and great distance in the US brought about a different developmental process in the US. In the very first years of steam railroads in the U.S., the inflexible British designed machines were found to track poorly. Local engineers decided the fix would be found in locomotive design, rather than improved railway construction. Engineers of the eastern states, such as Jervis and Norris would tackle the problem head on, and developed the 4-2-0 design. The 4-2-0 'Jervis' was a locomotive wheel arrangement of natural tracking ability. These 4-2-0s would become a national standard only eclipsed by the 4-4-0 'American' that superseded the 4-2-0. This was the only real glory the Single found in the US, but what a glory it was, with some 4-2-0 retained in service well into the 1860s. To read more about the early US singles, and the development of the 4-4-0, please do refer back to MasterClass 2001, background section of Chapter 3.

The Norris 4-2-0s would even be sold to Europe, and design concepts would again be copied into European built 4-2-0s. One such surviving example is the beautiful Norris inspired, Swiss designed, German built 4-2-0 *'Limmat'* of 1847. This locomotive is now proudly displayed at the Lucerne Transport Museum, Switzerland.



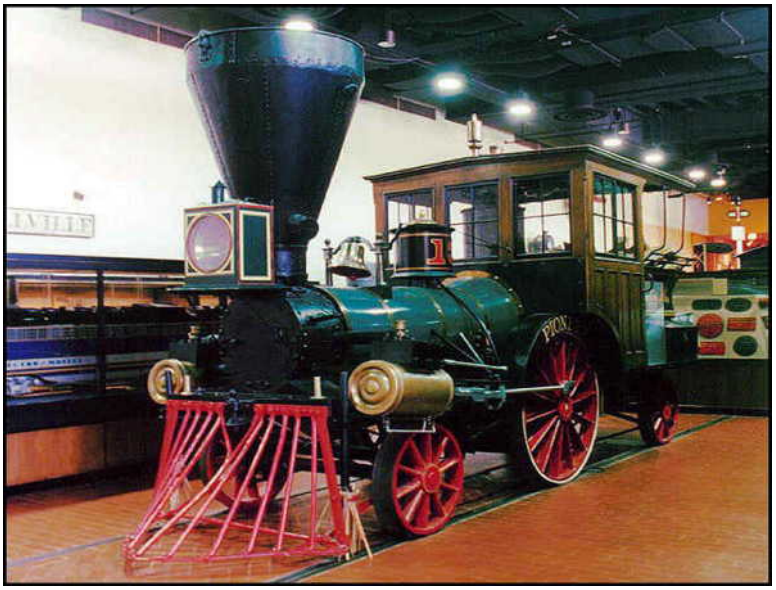




The US Experiments:
Leaving the Jervis and Norris 4-2-0s behind, in favor of fully equalised 4-4-0s and later 4-6-0s, it would seem the role on the Single in the US was at an end. Historically this would be correct. However it did not mean the US designers didn't continue to try the odd experiment with the Single. The remarkable speeds on the GWR in the UK had aroused many a curious locomotive designer in the US, and many of the Gooch ideas were at least experimented in the pursuit of speed. The real difficulty was that Gooch's machines had been designed for a rail gauge in excess of 7 ft, while the US designers were restricted to the standard gauge of 4' 8.5". Such speeds could not be easily attained with stability. As always US inventiveness would try to overcome this obstacle and some success was achieved, even though the locomotives built would not be used in any great numbers.

Additionally smaller Singles would roll out of the US workshops and have great success as light, versatile and durable lil machines. One such locomotive was the 'Pioneer' of 1851. Built as the most basic 2-2-2 type for the Cumberland Valley Railroad in Pennsylvania, the lil loco would find a niche that saw her continued in full-time presence on the RR until 1880. The lil Single covered some 250,000 miles and attained speeds of 40 MPH. She was a racehorse of great success.

For many years the *'Pioneer'* was preserved at the Smithsonian Institute's Museum of American History, the *'Pioneer'* right next to a giant that followed, the USRA, Southern Rwy PS4 Pacific. (She's now on permanent loan to the National Museum of Industrial History in Pennsylvania.) The next chapter will examine smaller U.S. singles in more detail, including the C.P. Huntington and her sisters.



The 'Pioneer' - 1851-1880, 70 MPH.

Oh what the heck, some of you want to see the PS4 don't you... alright, alright... just 45 deg. turn from this view of the Pioneer is this beauty!!

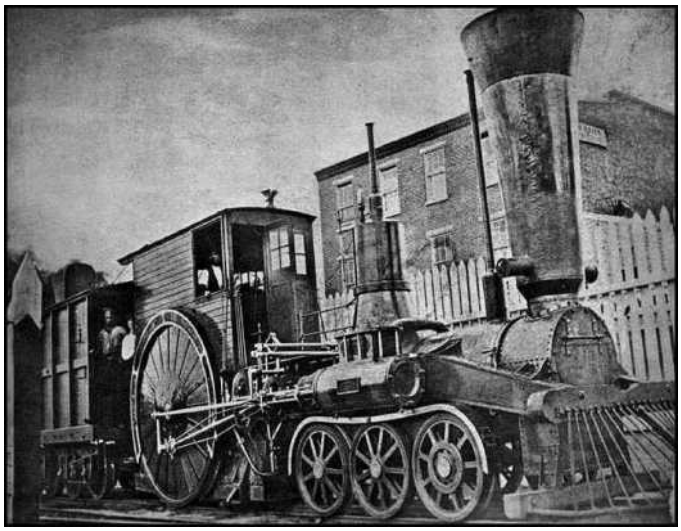
Wooooh! The Southern Rwy. PS4, 4-6-2, 1923... cool bananas.

Oh check it out... seen in the distant background of the above photo is Gerald Best's lil Hawaiian Cane loco *'Olomana.'* That lil loco often ran with Ward Kimball's *'Chloe,'* and both are made by LGB! Here is Olomana... not a *'Single,'* and no hope of 70mph, but how cute is this:

Ok that's enough about the locos at the Smithsonian!

The following series of experimental U.S. *'Singles'* you'll find in most U.S. books that have a section on *'weird'* designs. Weird only as seen today as compared to the known mainstream of locomotive history. Weird they were, but not without merit.

The Crampton - A good British Concept imported to the U.S.



The C&A, Norris Built Crampton 6-2-0. Note the huge driving wheels, slung behind the firebox and boiler resting just above the pilot truck. All in the name of speed and stability.

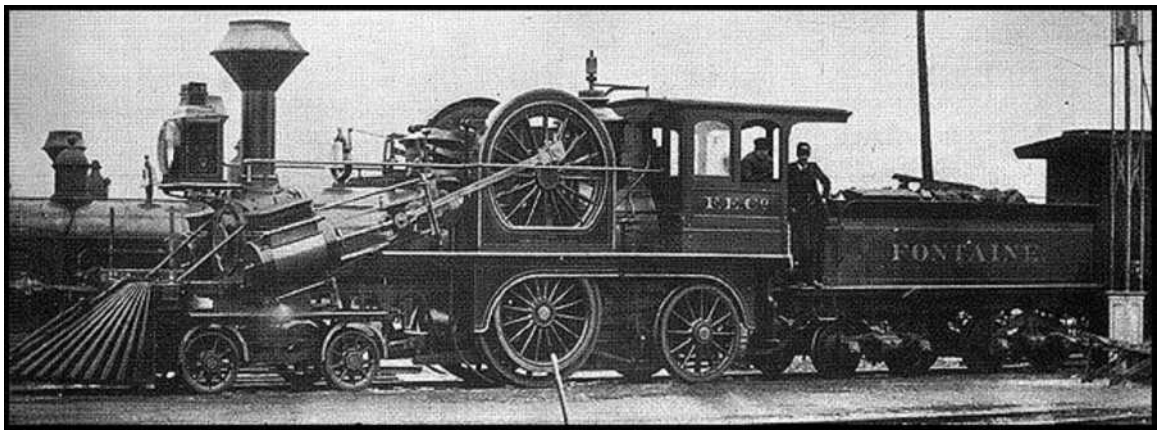
You have learned so far that the value of the Single, and its rebirth as a locomotive of note, is almost entirely due to the successes of the Daniel Gooch Singles of the GWR in the UK, 1840s-50s. Gooch laid out the principles upon which a fast 'Single' could be built. Among Gooch's employees was 37-year-old engineer Thomas Russell Crampton. Working under Gooch, Crampton took the Gooch ideals to their limit and developed the ultimate Single; a locomotive with driving wheels of huge proportions and the lowest slung boiler ever. The object was to provide great speed, with the lowest center of gravity, specifically to give the 'Single' some chance of speed and stability on gauges less than the GWR's 7 ft 1/2 in.

The locomotive featured an axle with large 7 ft driving wheels, placed behind the boiler, with the boiler slung as low as possible above the pilot truck. The boiler was so low, it sat only inches above the axles of the pilot truck. The first two Crampton Patent 'Singles' were built in 1846 for the British owned Liege & Namur Railway in Belgium. The design was so successful, many more were built for the UK, Germany and France... and the U.S.!

The Camden & Amboy RR in the US is noted as a pioneering railway. Over most of the mid 1800s, the C&A would be first to try many steam innovations. Many successful, others not. The President of the C&A saw Crampton locos at work in the UK in the 1840s, and decided to take the concept home with him. Working with the C&A's noted engineer, Isaac Dripps (of 'John Bull' fame). Dripps developed a homegrown Crampton for the C&A. The Single had 8' drivers, and a 6 wheel pilot truck for added lateral stability. The first of the new Crampton/Dripps 6-2-0 types were built in 1849 by the Norris works in Philadelphia. Although Dripps was less than happy with the performance of the loco, C&A Peseident, Stevens, demanded more be built. The locomotives proved to be very fast, but did not track well and had insufficient traction when starting. The Norris built Crampton in the following photo, was built for the C&A in 1850, and is one of the later versions.

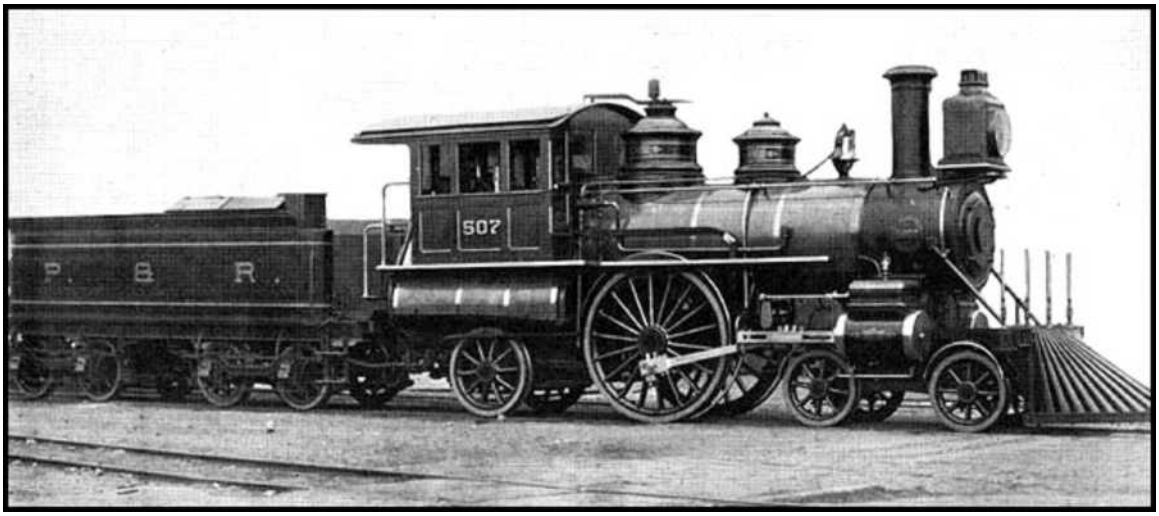
The Fontaine 4-2-2:

Eugene Fontaine of Detroit, attempted to design a fast 'Single' in 1880. His methodology was to keep the boiler low slung (low center of gravity) and create a drive wheel system that would effectively provide a drive wheel size of 80+". What developed was virtually a type of geared loco, but unlike Shay's etc, the loco was geared 'up' rather than down. The locomotive was a 4-2-2 design, with large 72" 'power' wheels and axle slung across the boiler top. These were run against the lower 70" driving wheels below via friction wheels, mounted to the drive wheel sides The large upper 72" wheel would power the smaller 56" friction wheels, which were direct fixed to the lower 70" drive wheels...The total outcome was a system that saw every piston stoke push the loco along 30' of rail, yet there were none of the huge 8' drive wheels and high boilers normally associated with 'Singles'. Additionally the upper power wheel could be raised and lowered by a pneumatic system, controlled in the cab, which could control the level of friction between the upper power wheel, and drive wheels. Two of the Fontaine 4-2-2s were built by the Grant works in 1881. The design theory was sound, but in practice placed great resistance against the pistons and the locomotive required considerable power to get moving. After much debate as to their advantages, *'Fontaine's Folly'* were rebuilt in 1884 as normal 4-4-0s, for the Wheeling & Lake Erie R.R.



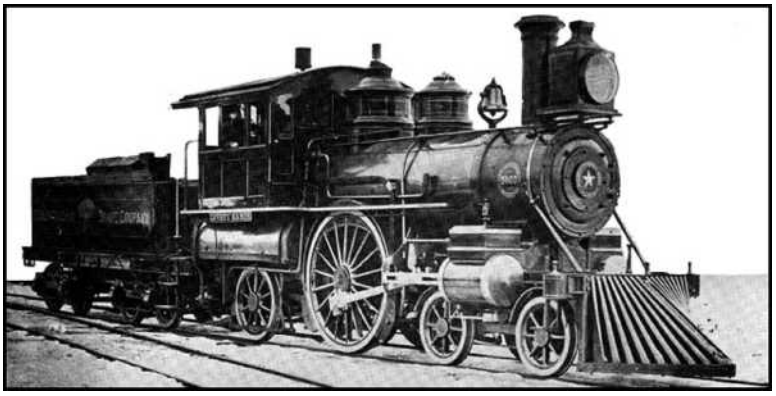
Baldwin's 5000th, a Fast 4-2-2.

Built as the 5000th loco to come out of the Baldwin works, this unique Single was built specifically for a crack passenger express on the Delaware & Bound Brook Railroad in 1880, owned by the parent company, the Philadelphia & Reading RR. The locomotive was designed as a fine Anthracite (hard coal) burner, and featured a 7' wide 'Wootten' firebox. The Wootten design allowed for a wide grate area of a firebox slung above the loco's frame. The wide grate allowed for efficient and fast burning of coal. The wide firebox featured two fire doors on the backhead to aid the fireman in spreading coal evenly over the grate. Another novel feature of the loco was a steam driven system of beams and fulcrums attached to the equalised running gear of the loco, that could effectively alter the distribution of load over the wheels, providing greater weight over the drive wheel when needed, and reducing load when the loco was running at speed. The system was patented by William Henszey of the Baldwin Locomotive Works. Clearly they were trying to address the traction issues associated with 'Singles' through minor, cab controlled alterations to the locomotive's equalising.

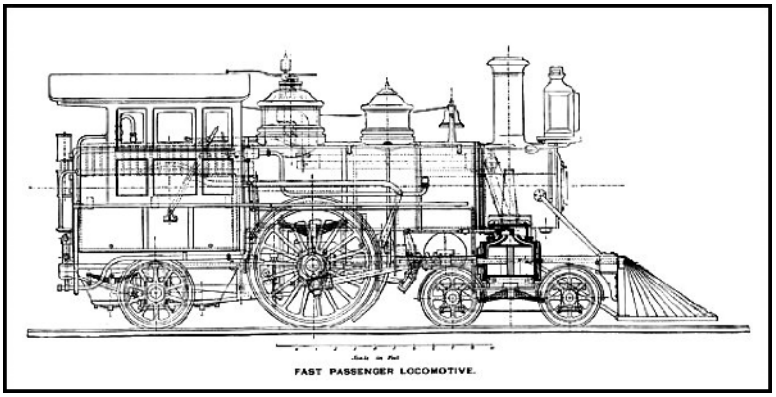


Builder's Photo of the Philadelphia & Reading 4-2-2.

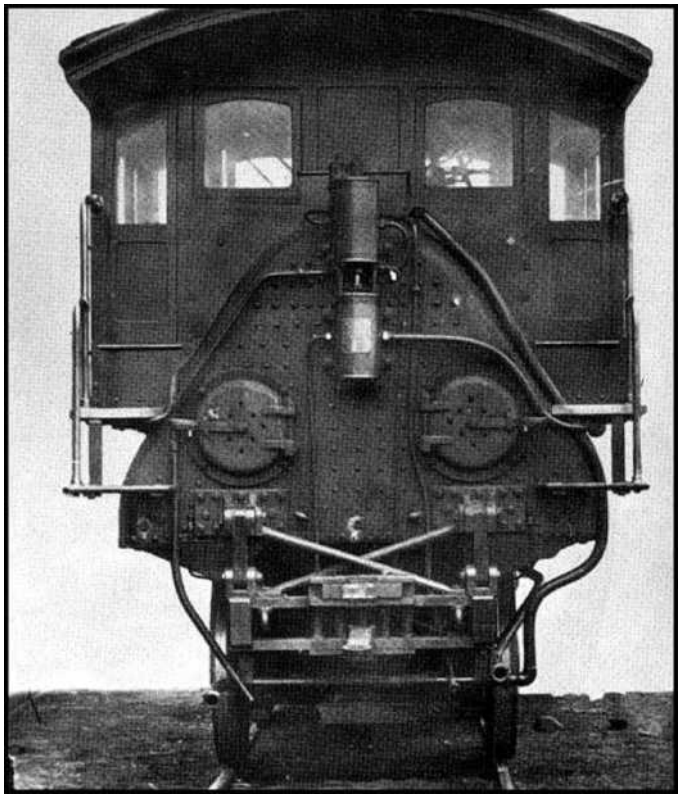
According to the Baldwin catalogue, this 8-30-A 4-2-2 fast passenger loco had a drive wheel size of 78". Its May 1880 in-service trials saw the loco haul 4 cars over the 98 miles in 1 hour, 38mins, or around 60mph. The locomotive was designed to do the run between NY and Philadelphia in 2 hours. She was later returned to Baldwin when the RR experienced financial troubles. The gracious 4-2-2 was then sold on to the Eames Vacuum Brake company as a demonstration loco, renamed 'Lovett Eames', and sent to the UK to sell and market the Eames system in 1881. She was later sold to the Great Northern Railway in the UK.



The 4-2-2 fitted with the Eames Brake System.



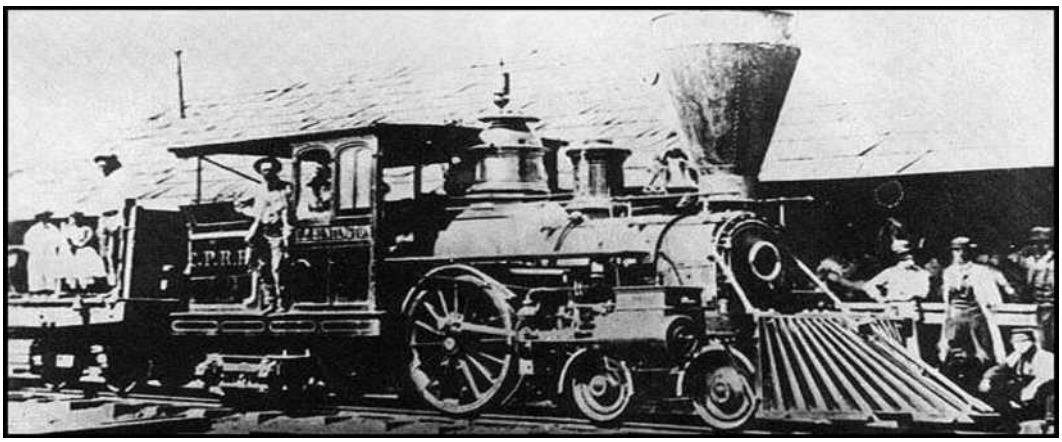
From the Baldwin Catalogue.



The twin fire door backhead of the Wootten firebox.

The Danforth Cooke 4-2-4T of 1863:

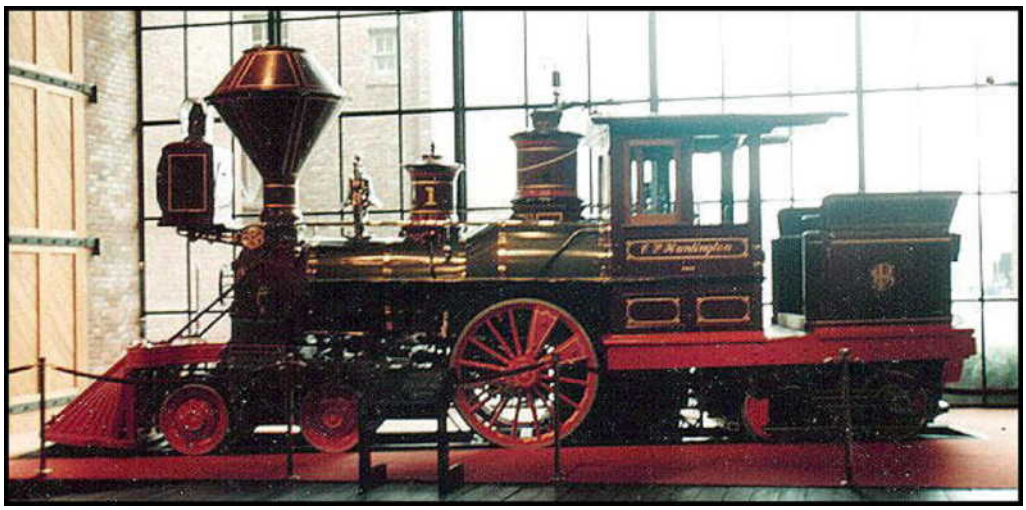
During the frontier years of the old west, the developing railroads of California required locomotives at short notice, leading to some interesting roster mixes.. In the 1860s, when most eastern roads had progressed to the use of large 4-4-0s, a select group of 'Singles' were built by Danforth Cooke & Co for light traffic use. Locomotive #3 *'Collis P. Huntington'* of the new Central Pacific RR was one such *'Single'* and has become a favorite among RR enthusiasts. She had many of the fine features of the great 'Singles' yet her diminutive size puts her into a different category. A small, light locomotive, of good speed, low tractive effort, for short trains used on short lines. Interurban lines, elevated railways, suburban lines, short-lines and frontier lines were all locations where the sturdy US single could be found. The *'C.P. Huntington'* and her Sisters have their own story, which we shall leave to the next chapter.

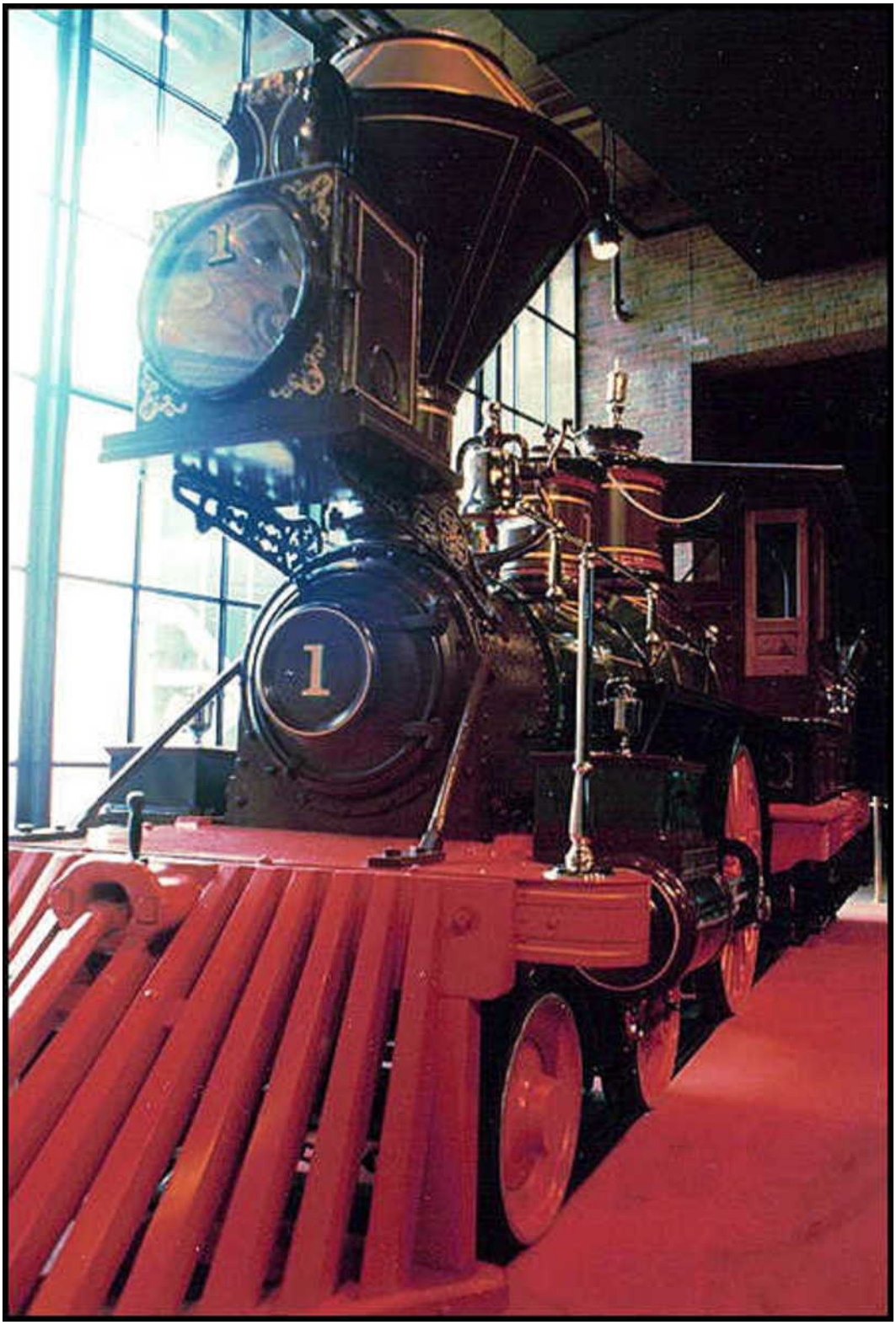


The CP Huntington in 'as built' condition during the 1860s.

The C.P. Huntington as restored in 1914 by the SP.

Preserved at the California State R.R. Museum in Sacramento, California, and retained in the 1914 restoration configuration to this day.

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