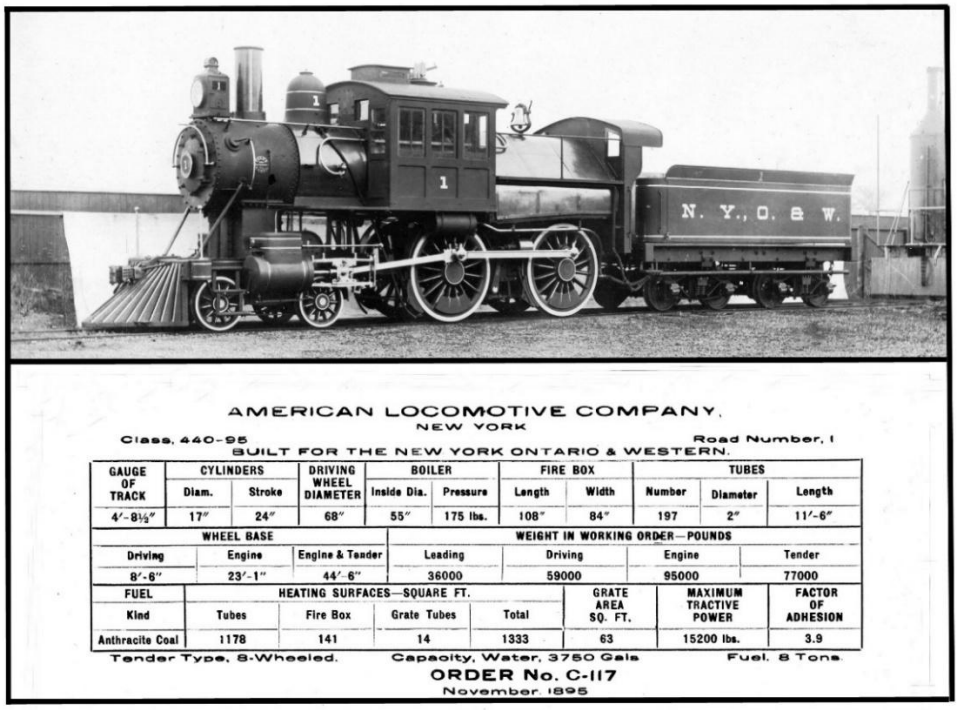
O&W Ramblings No. 62 in a Series
When N.Y.O.&W. Ry. (2nd) No. 1 was "First"
By Mal Houck NMRA MMR
All photos from prints or negatives of author's collections.



AMERICAN LOCOMOTIVE COMPANY.
NEW YORK

Class, 440-95 Road Number, 1
BUILT FOR THE NEW YORK ONTARIO & WESTERN.

GAUGE OF TRACK	CYLINDERS		DRIVING WHEEL DIAMETER	BOILER		FIRE BOX		TUBES		
	Diam.	Stroke		Inside Dia.	Pressure	Length	Width	Number	Diameter	Length
4′-8½″	17″	24″	68″	55″	175 lbs.	108″	84″	197	2″	11′-6″

WHEEL BASE			WEIGHT IN WORKING ORDER—POUNDS			
Driving	Engine	Engine & Tender	Leading	Driving	Engine	Tender
8′-6″	23′-1″	44′-6″	36000	59000	95000	77000

FUEL	HEATING SURFACES—SQUARE FT.				GRATE AREA SQ. FT.	MAXIMUM TRACTIVE POWER	FACTOR OF ADHESION
Kind	Tubes	Fire Box	Grate Tubes	Total			
Anthracite Coal	1178	141	14	1333	63	15200 lbs.	3.9

Tender Type, 8-Wheeled. Capacity, Water, 3750 Gals. Fuel, 8 Tons.

ORDER No. C-117
November, 1895

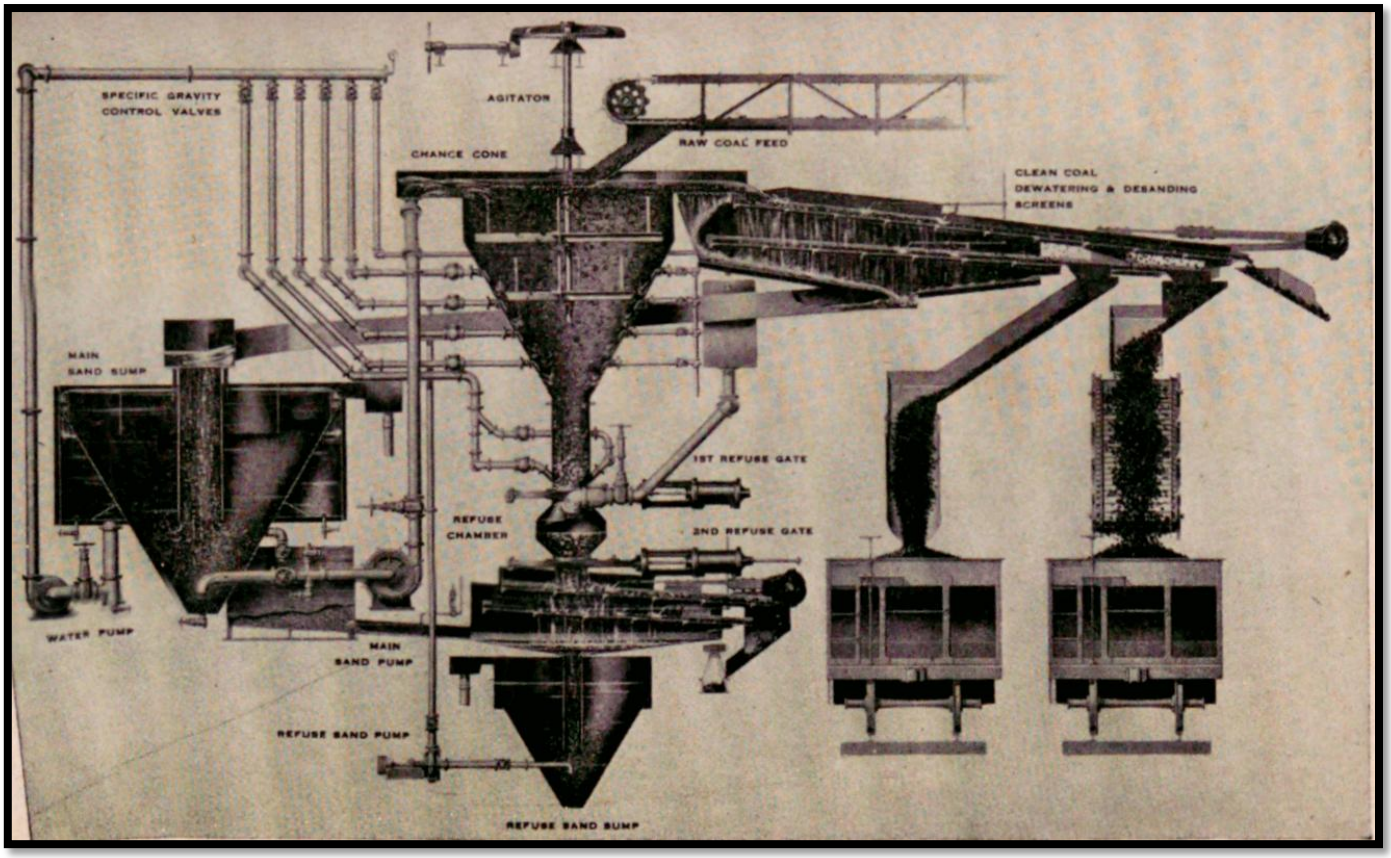
This image is a composite of the front and rear of a "paster" for Double Cab Class B 4-4-0 "Eight-Wheeler" rebuilt from a "conventional" Single Cab engine by the Cooke Locomotive Works of Paterson, New Jersey and delivered to the O&W in November 1895. The large (huge(!) glass plate negatives of Builder's Photos, such as here, were commonly "edited" by painting out undesirable portions of the image with "Ruby Lith." The "blue sensitive" orthochromatic print films of the era presented such editing as a blank space. Here, it also looks as if some editing was done with an opaque medium depicting crescent shaped Davis counterweights not ever worn by 2nd No. 1.

As the O&W advance into the Northern Anthracite coal fields of Lackawanna and Wyoming Counties of Pennsylvania proceeded after the opening of the Scranton Branch in June 1890, its volumes of coal for transport steadily increased. So too did the accumulation of coal refuse from the processing of the mine-run coal to render the sizes in consumer demand; - "Nut," "egg," and "lump" for use in kitchen ranges and parlor stoves (in the 19th Century era before central heating). Smaller processed sizes pf "pea" and "buckwheat" were used in smaller industrial (cupola) furnaces in foundries and for blacksmithing forges. That refuse was of yet smaller sizes unsuitable for use on common fire grates in Parlor Stoves or kitchen ranges was known in the region as "culm" or "slack"; - the latter containing non-combustible contaminants of slate and sandstone common to "Mine-run" coal.

To the extent that culm contained much combustible material, the simple discard into ever-increasing dumps and banks, a hazard of fire was at all times present; -- with ignition possible due to spontaneous combustion from within, or externally from a lightning strike, a wildfire adjacent or the careless local discard of other combustibles. Since coal mining and anthracite coal processing was undertaken on an industrial scale the volumes handled in any one mine or preparation plant location were in the tens, hundreds or thousands of tons: -- and then greater over the then expanding anthracite coal field workings. And whereas the approximate yield of saleable processed coal sizes was about 80% of the tonnage of mine-run coal, the 20% (therefore) of culm and slack residues were also in quantities of many tons, but then there was only so much otherwise non-productive land on which to place the accumulating non-productive discards. That culm was easily at hand in the local culm dumps and with culm still

containing combustible properties, to simply discard and disregard its potential as a fuel seemed shortsighted, considering industry-wide developments to handle culm.

While the mine / collieries and the processing breakers were increasingly well developed, a contemporaneous advance in coal handling was the development of the "Washery." The anthracite fields employed several washing processes (also known technically as "Separation") to remove slack, "fines" and coal dust from breaker processed coal; -- a very common usage was with the "Chance Cone" system (long a favorite of the D&H Hudson coal operators). Also popular was the Menzies Cone system.



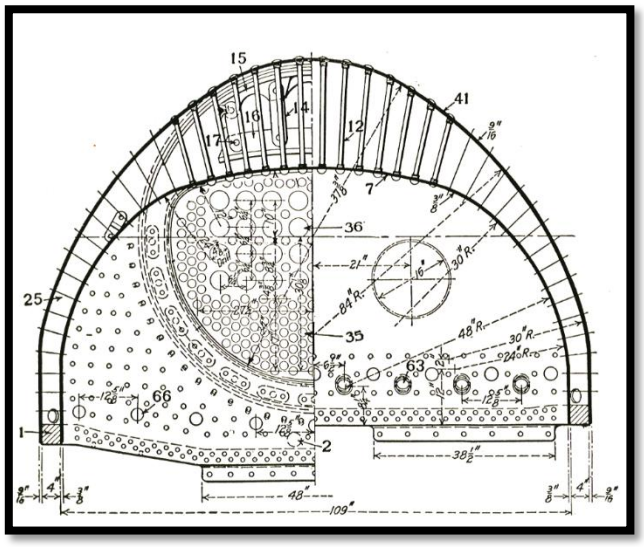
This diagram is representative of the Chance Cone Separator system employed by many of the washery operations in the O&W service area.

Both the Chance Cone and Menzies systems employed a mixture of water and fine sand mixed to a specific gravity of between 1.6 and 1.8. At that density the anthracite coal would float to the surface of a mixture in a large conical vessel with a centerline stirring paddle and mechanism. The heavier slack would sink to the bottom of this cone, while the buoyant coal (as the water sand mixture was constantly replenished) would spill out over the side of the cone, dropping into a tray surrounding the bottom of the multi-part flotation washing apparatus. Spill-over sand was recycled back into the mix and periodically the slack was removed from the bottom of the Cone for ultimate discard or further processing for use in concrete o as an admixture in bituminous concrete ("asphalt").

As an aside, this method of separation via flotation is very similar to the removal of slag from liquid steel in the Open-Hearth process; -- whereby when a "heat" is tapped, it is poured into a ladle with the less dense slag floating atop the liquid steel. As the ladle is filled to the top, the lighter slag spills over the edges of the ladle and drips to the floor of the casting aisle. . .for later cleanup and discard or for use in other industrial processes. All this is to say that methods to separate materials of differing densities, in industrial processes and quantities, can be remarkably similar. . . . all relying upon the floatation of a material sought either to be recovered or discarded!

General Manager J.E. Childs sought a solution both to dispose of the growing culm banks and to obtain some value from the small sizes of the culm. Contemporaneously, as the O&W volume of business grew with the expansion of its coal business, there came to be (as there always was) operating department concerns about, and study of, locomotive efficiency and fuel consumption. By 1895 there were a dozen or more contemporary eight-

Wheeler types on the O&W roster, all fueled with bituminous coal. The O&W, in comparative development tests, had determined that the optimum cylinder diameter – piston stroke dimensions were 17" (diameter) X 24" (stroke), whereas many other builders of the time had provided similar engines with 18" X 24" bore / stroke combinations. Engines with the latter features were found to "starve" for steam under heavy load while encountering grades. Childs went to Motive Power Superintendent George Washington West who contacted Cooke Locomotive & Machine Works for the construction of a firebox / grate that would burn the smaller sizes of anthracite. All this occurred at a time when all railroads sought to obtain improved operating / fuel consumption economy . . . . and whereas Supt. West sought to eschew the then popular compound locomotive designs.



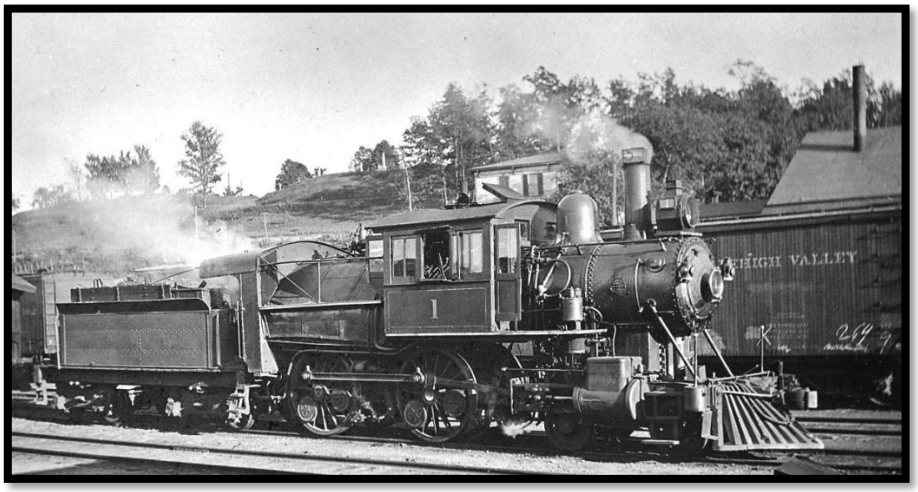
The optimum firebox / grate combination is found in the Wooten Fire box; diagram here of typical design, though shown here of greater width than the 7' 9" width of the Cooke built firebox for 2nd No.1.

This so-called "Wooten" firebox design was developed ca. 1877 by John E. Wooten, then Philadelphia & Reading General Manager, also to burn culm as locomotive fuel. Due to the need for a wide and thin fire bed of anthracite coal the Wooten design required an extreme width of the grates and, accordingly the fire box itself, as shown in this diagram. Wooten, at this earlier date in the development of the Anthracite Fields, recognized the value of anthracite in terms of locomitve fuel economy, insofar as anthracite coal produces more heat per ton of fuel in contrast to bituminous coal producing more heat per hour.

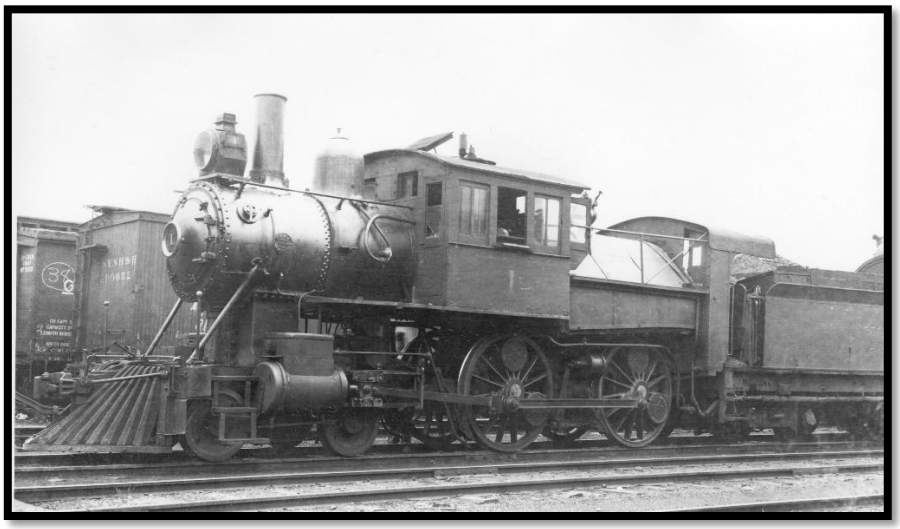
Since that extreme fire box width left little for placement of the locomotive cab to the rear of the backhead. The result was the development of the Camelback /Double Cab/ Center Cab / Mother Hubbard locomotive. The value in the usage of washery culm output and the apparent potential of increased fuel economy was not lost on either General Manager Childs nor Superintendent West.

A single cab 4-4-0 "Eight-Wheeler," either No.31 or No. 39 was selected by G.W. West for rebuilding by Cooke. The precise number of the "donor" engine cannot be determined accurately since the O&W locomotive roster numbering is, at best confusing (due to multiple re-numbering(s)) and, in many respects incomplete

Delivered up from Cooke in November 1895, the rebuilt Eight-Wheeler, now as 2nd No. 1, was immediately placed in branch line service to Delhi, and to Monticello.



Here captured at Monticello. April 1908, the rebuilt 2nd No. 1 displays its distinctive circular Davis counterweights, a smooth paneled cab side and replacement headlamp.



Here, 2nd No.1 presents its left side view, as captured at Sidney.

The other specifications of 2nd No, 1 are; -- Weight – 118,000# (pounds). Weight on Drivers 76,000# with 38,000#on the lead truck. With a Tractive effort of 17,100# the Factor of Adhesion works to 4.45. The 56" diameter boiler enclosed 197 2" dia. fire tubes each 11' 6" long. The Cooke built firebox was 108" long but contained no combustion chamber (as was the contemporary practice with locomotives operating on saturated steam).

As for performance and fuel economy 2nd No.1 and a near duplicate Class C Eight-Wheeler No. 13, also rebuilt by Cooke only a year after 2nd No. 1, both were run between Delhi and Utica on trains No. 13 and No. 14. Fuel economy was compared to a similar 4-4-0 Eight-Wheeler (Class G no. 77) burning bituminous coal over mileage tests of a cumulative 1400 miles each. The anthracite burners consumed 98,596# (71.8 # per engine mile) of coal costing $26.88. No. 77 burned 67,000# (53.6# per engine mile) of bituminous costing $53.60. Based upon comparative tests the fuel……the fuel cost for the anthracite burners results in a saving (rounded) of 50%.....!

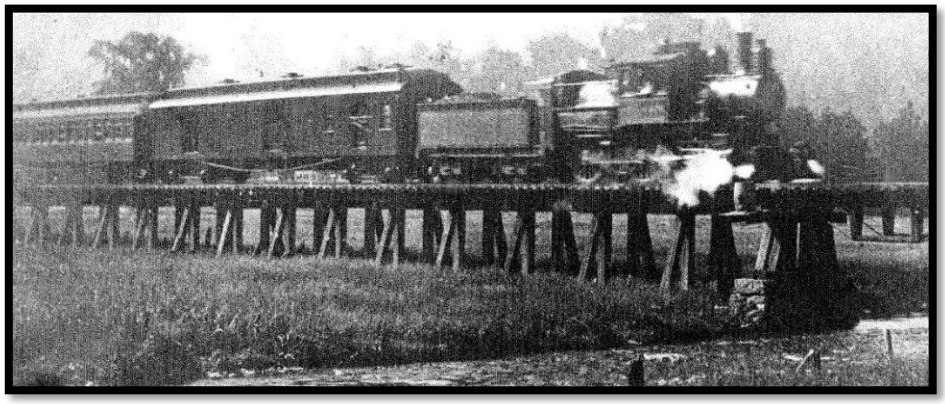
In O&W road testing (not clear where, but certainly not on the branch lines of original assignment for 2nd No. 1) Class C "Eight-Wheelers" of similar specification and conversion by Cooke or Dickson could maintain a steady speed of 79 mph(!) with heavy load.

With the operational success of the Cooke rebuild of 2nd No. 1 in terms of both fuel economy and the capability of burning cheap washery processed culm the O&W set a course for the conversion of multiple Class C Eight-Wheeler types, then followed by purchase of the several more well-known classes of O&W Double Cab locomotives.

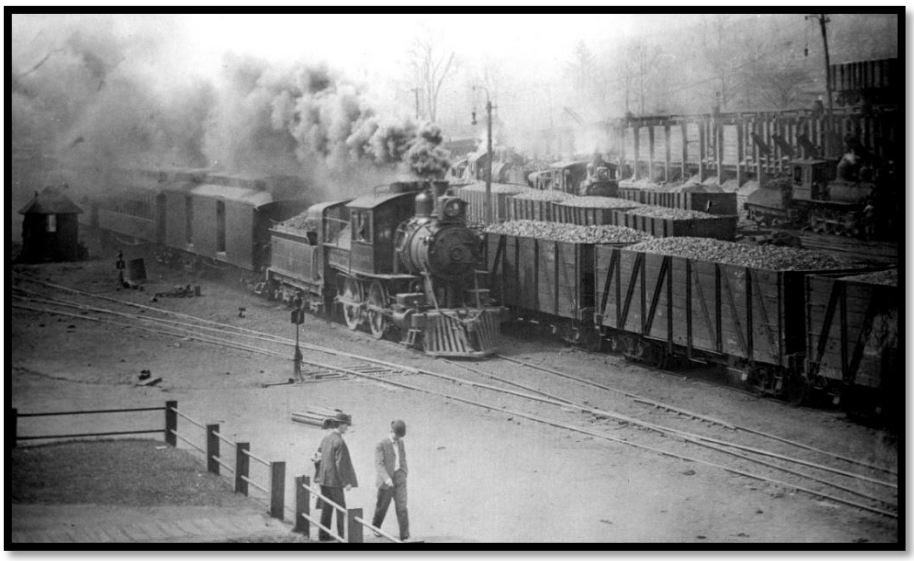
A small album here of some of the O&W Eight-Wheeler double Cab rebuilds……

2nd No. 1 here, still in service, but snugged down at AV to await its next call

One of the Class C Eight-Wheeler Double Cabs draws an accommodation train of open platform coaches, with an open platform baggage mail past Phillipsport depot on its run from Summitville to Port Jervis.

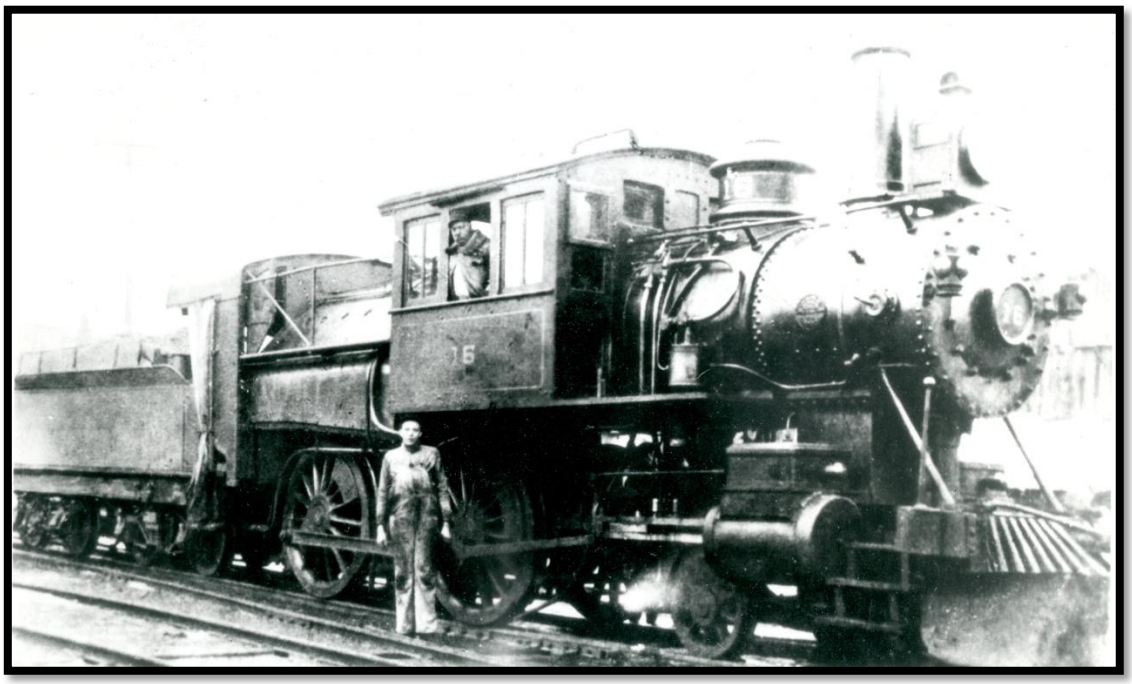


Service to Delhi on the branch terminating there begins at Walton, with a trek and passage over a low marsh before crossing West Brook. Here, an early image has (presumably) 2nd N0. 1 drawing the daily train to Delhi about to make that crossing.



This well circulated image is from the era of system-wide passenger service on the O&W with one of the Double Cab Eight Wheelers drawing a passenger consist through the Mayfield Yards.

Class C 2nd No.13, as rebuilt by Cooke Locomotive Works from 4-4-0 No. 30 was a regular on the run to Sylvan Beach, as captured here at Sylvan Depot.



Class C 2nd No. 16 is one of the Eight-Wheeler "Donor" engines to the Double Cab rebuild program to retain the ornate sand box of original equipment. Its regular assignment evidently took it to some the reaches of the O&W subject to heavy snowfall; -- as suggested by the ersatz plow of the "cowcatcher" style pilot.

HO Scale Class B 2nd NO. 1 has paused at the Summitville depot, and is just starting to make its assault on the grade up to Mamakating and the high View Tunnel beyond……