

impressed with Shay's operation. Alley with his experience as a businessman, immediately understood how the use of a locomotive on his own large tracts of land would save him money and time. Alley went to William Crippen in an attempt to have a logging locomotive built, however he found Crippen & Son were already backlogged on the new locomotives for other loggers.

Alley turned next to the Lima Machine Works of Lima Ohio [formerly Carnes, Agerter & Co.], a well-known Machine Works. Shay had been dealing with this firm since 1873. This company specialized in manufacturing agricultural implements, boilers, gearing, lathes and other general machinery and sawmill equipment. Though not in the locomotive business, Alley convinced them to build their first locomotive. Alley had sketched out a concept following Shay's original logging locomotive and taken it to Lima, however Lima had success in Fontaine style steam tractors and appear to have based their first locomotive somewhat on that design. Alley in fact purchased the two additional locomotives, a 0-4-0 and a 0-6-0.

George W. Disman, from Lima Machine Works traveled to Michigan, to see Ephraim Shay's engine and William Crippen. Ira Carnes, an employee of Lima Machine Works worked on the plans for this first locomotive for seven months completing them in late October. Much of this time was put into testing ideas. The actual construction on the locomotive was started in the summer and the first real operational tests were not until the end of November. It was shipped from Lima on the 4th of December and arrived at Alley's location on 12-9-1878. It was numbered #129 when put to use

Improving On Success

Ephraim continued tinkering with his locomotive throughout 1878 and 1879 making improvements until he came to the point he needed a major renovation. Shay contacted Lima Machine Works who dispatched George Disman the 380 miles up to Haring in January 1880. Disman met with Shay and discussed the changes to be made and how best to complete the work. They arranged for the locomotive to be shipped down to Lima Machine Works for the work.

Why Lima Machine Works and not William Crippen who was a major factor in developing the first Shay? The obvious conclusion was Crippen's own success. Shay may have faced the same problem Alley did in 1878, Crippen was simply too busy to visit Shay. Lima, whom Shay had a long term relationship with already, due to sawmill implement purchases, had foreseen the potential of a logging locomotive and sent Disman.

When the locomotive arrived at Lima Machine Works only the rear truck was powered through a series of gears over the inside portion of the rear truck. Since Shay was constantly experimenting, it was not recorded exactly how it was operating. The engine arrived in late January 1880 where John Carnes a talented machinist and part owner became deeply involved in modifying the Shay.

Carnes came up with the concept of powering both trucks by means of bevel gears on the outside face of the wheels on one side. These would be powered by bevel gears on shafts mounted on the outside of the trucks, the shafts being connected to a crankshaft mounted centered on the side and turned by the engine mounted on the edge of the car above. This is the classic arrangement of Shay locomotives engines and gearing that would be used for all Shays built by Lima Machine Works. Why Carnes did not patent this design for himself or Lima Machine Works is a mystery, however within Lima it was known as the "Carnes design".

No other work was necessary on the locomotive and it was shipped back to Haring on April 26th 1880. Lima did not assign a construction number or shop number to this locomotive as they only re-built it for Shay. It would also be the only locomotive Lima ever worked on for Ephraim Shay. Of the 2767 Lima Shays built, none were ever for Ephraim Shay himself.