My Claud Hamilton Locomotive

This document was written by Geoff King and was originally published by The Colchester Society of Model and Experimental Engineers in two parts in 2021.

In the Club auction in 2003 there was a part built set of locomotive frames for sale. No one appeared to know what the frames were for, as what was there did not match up to any known frame sizes. The frames were fitted with part machined cylinder block, axle boxes, and a crank shaft, with the last trailing axle. No one would make a bid for it, and in a mad moment I bid £5.

Bang! Down went the hammer and I had bought the lot for a fiver. When I had taken the frames home I started to check over what I had bought. To my surprise the crankshaft in the frames had been machined up from a solid steel bar. No mean task!!! The cylinder block was part machined up, but the cylinder bores and piston valves had not been done. There were also four driving wheels, also un-machined. What was the locomotive that someone had started on, done a lot of skilled work and then abandoned? In addition to this there was a selection of wooden patterns in a box. Not knowing what they were for they were put away at the back of my garage and forgotten about for now.

On the frames there was a large oval shaped cut out between the driving axles, consistent with a Claud, but the frames were too short to be from a Martin Evans design Claud. Eventually, I 5 found a drawing of the full size loco in the Club library. They showed the overall dimensions of the frames and when scaled down they exactly matched my frames. Martin Evans had scaled his locomotive at 1 1/16” to the foot, i.e. to exactly to 1/12th full size for 5 inch gauge. My frames now made sense; they were at 1” to the foot, three inches shorter than the published design in length.

I started to search for clues to find out where the frames had been made, and eventually traced them back. I found that they had been started by an engineer working at the Cambridge engine shed by the name of Jack Partridge, who was working from the original drawings way back in the 1950`s.

This accounted for the cylinder block being for piston valves, which were used on the Super Clauds D16/3 locomotives. I made the decision to continue with building the locomotive. This meant that I would have to rescale the drawings, and lose 1/16th in every 1” of the loco. Also Martin Evans had designed his Claud with slide valves, and I would have to scale some from another design, or design my own piston valves from the original drawings to use the cylinder block already in the frames.

I started work later in 2003 machining the wheels that had come with the frames. At the same time I ordered a set of castings for the front bogie frames from Norman Spink and then started work on the bogie. The driving wheels did not have the balance weights cast in, so false weights were made and fitted in.

Before proceeding with the rear axle, I checked the centres of the axle boxes in the frames. Tool makers buttons were made to fit into the axle boxes. The coupling rods were then roughed out and tapped 2 BA where the bearings were intended to be. The buttons were then inserted into the axle

boxes and screwed onto the coupling rods. The coupling rods were then set up on an angle bracket in the lathe, where the ends were drilled and machined for the bushes. This way I knew that my coupling rods and the axles were at exactly the same centres. All went well and when the wheels had been quartered, and the coupling rods were on, the wheels turned freely.

Work then started on the cylinders and valve gear. The original motion plate was scrapped and a new one made to the Martin Evans design after adjustments to the dimensions. The cylinder bores were done and pistons were turned to fit. At this point I obtained a set of Great Eastern drawings for a Claud D16/3 locomotive. Work continued on the valve gear, making the required dimensional changes as I went along. The connecting rods were also made with changed dimensions, being 5/16th inches shorter than the published design.

I had already made a locomotive with piston valves [LMS 8f] and had learnt a lot from this. The 8f pistons had cast iron piston rings and piston valves and although a good runner the valves were not totally steam tight. I had already had experience of pneumatic valves using O rings passing over a large number of small holes and these had been no trouble and had a long life. I then designed piston valves for the Claud with PTFE piston rings on the valves passing over ports consisting of many small holes [1/16th inch] in diameter. Each port on the piston valve sleeve consisted of 90 holes in three rows of 30 holes. This eventually proved to be a great success and was published in Model Engineer.

Having completed the cylinders and valve gear in part 1, Geoff now goes on to finish the loco… One of the problems with machined from solid crank shafts is the fitting of the eccentrics and getting the valve timing right. The usual method is to make split eccentrics across the centre and then hold the two halves together with two cap head screws recessed into the eccentric. I have had problems with this method in the past and redesigned the ones for Claud. I decided to make them as shown in my sketch (below) with a tapped thread passing straight through across the eccentric. This has been very successful so far. The grub screws locking the eccentrics no longer force open the eccentrics when tightened up to lock the eccentrics on the crankshaft.

With the locomotive frames and cylinders completed and test run on compressed air, I then made the running boards and the reverser. Attention then turned to the tender. The castings were ordered i.e. horns, dummy springs, axle boxes and tender wheels. Building the tender went without any problems, with minor dimensional changes to allow for the different scale. The tender body was now made with my now standard sump/filter box between the frames. The other mod made on the tender was the hand pump, which was made with the pump handle pivoted on an “A” frame, which overcomes any side loads on the ram, and then mounted sideways in the tender. The remainder of the tender was made to the full size Great Eastern drawing, but with reference to Martin Evans version. The tender was completed with all the lockers etc. The pipework was also done, taking all the water from the filtered sump for the locomotive.

Work then returned to the boiler. The first to be made was the smoke box, which was rolled up from 1/8” steel plate on my homemade rollers. These do not have gears to turn the rollers but have spanner hexagons on the ends of the rollers so you can turn them in opposite directions if you have something a wee bit on the awkward side. The front and rear rings were turned and then the smoke box was made complete with the Great Eastern stainless steel ring on the front. The boiler gave me no problems and was ready for testing in three months. The super heater is to my own design (see Spring 2019 LINK issue No. 54) and goes back almost to the fire box door. Work continued and everything was ready for the first steam test by September 2006.

There followed test runs in steam, some of these being on an oiled board at home, tuning up the petticoat and blast nozzle, and by April 2007 was considered ready to paint and line out. At this point disaster struck! The trailing driving wheel set rolled off the bench and smashed one of the wheels. This disaster was caused by the balance weights being in the wrong place when I put the

wheels down on the bench and when I made the bench vibrate they rolled over the side. I went to Blackgates for a replacement and we did a deal. Blackgates gave me a new wheel casting in exchange for the wooden patterns that I still had. I have been forever grateful for this generous gesture. I am still very aware of where the balance weights are when I put wheels down on the bench.

Regular running now occurred and minor tuning up continued for a while. Eventually all seemed good. The loco was painted okay and lined out with a Bob Moore lining out pen made from a hypodermic needle. I still have all the templates used to do the lining out should it ever need to be done again. The locomotive has now been run 118 times and has done 512 miles with no major problems. If any member would like to see my loco or have a drive, they only have to ask and I will show them all the changes I have made

Method of making eccentrics for one piece solid crankshaft