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"Building a firefly from Scratch"

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For those of us who are beginners, and I place myself very firmly in that category, I thought it may be of some interest to start a new series on building a loco from scratch.



Some three years ago I bought online from HomeWorkshop (the machinery listing ecommerce website, not the commercial venture) a complete set of castings and a boiler kit for Martin Evans 'Firefly', a GWR small Prairie, for the very reasonable sum of £600. The boiler kit alone is listed by Reeves at £625.

A very heavy pallet duly landed on my driveway with the boiler kit wrapped in a duvet and all the castings and stretchers well boxed.

Laser cut frames were ordered from Kennions; hacksaw and files are definitely not the way to go now that laser cutting is so easily available.

Progress then stopped for approximately three years as I was sidetracked by buying a traction engine.

I then wanted to start on the rail loco and while I am quite prepared to remake parts due to my mistakes, the one thing that was giving me concern was the boiler; any mistakes with this would be both expensive irretrievable. This is where the benefit of belonging to a club with helpful and generous members lightened my load when Glen Payne offered to build the boiler for me.

The entire series of build articles (less one missing issue) by Martin Evans and published in Model Engineer in the early 60's was held in the club library so serious photocopying was undertaken.

With the frames and stretchers assembled the next step seemed to be to machine the horns which were supplied cast in pairs to be sawn apart.





A few years ago, I asked Kevan how to machine them and he said "make a fixture", so I figured out what he meant and in retrospect I can't see any other way of machining them. A piece of aluminium was skimmed flat with a tongue to clamp in the milling vice and the horns clamped in place to mill the back face flat. Due to differences in the castings some horns needed more taking off than others in order to get a clean surface.



The guides were machined to width and thickness at the same time. Depth of cut was set up with gauge blocks (club auction purchase) and disaster was avoided when on checking I realised that my frames were 5mm instead of 3/16" as on the drawing.

The width of the guides was very uneven on the castings, one side being much thicker than the other, but thanks to the DRO they were machined approximately even. A recess was then milled into the

fixture and clamps made to hold the horns in place to mill the outer face. This is where the differences in the castings came to light, overall thickness should be 0.625 but mine varied between 0.602 and 0.620. They were all milled down to 0.590 and the axle boxes will be machined to suit.

There was then a pause in machining while I covered the workshop in dust while making the formers for the firebox inner and outer wrappers. Those of you who have seen Glen's pictures of his work so far will be impressed by the



cleanliness and the speed at which he works; no doubt it will be seen at a future bits & pieces evening.

Some of you will have seen the presentation at a Thursday club meeting that Glenn Payne gave on his work on my boiler, and have been impressed by his attention to detail and high standard of workmanship so some photos are appended to the end of this.

First of my jobs was to remove some work already done; following Martin Evans' instructions the two reinforcing plates at the front of the frames were rivetted in place. I then realised that it was not going to be possible to clamp the frames back-to-back with these in place so it was a case of milling off the rivet heads and knocking the rivets out – no wonder progress is slow.

The horns were numbered, clamped in position on the frames and drilled for the rivets, $16 \times 3/32$ " for each horn – all without breaking the drill.



Having previously attempted some riveting, and realising that without three pairs of hands I needed some help, I roughed up a scrap wood support to hold the frames in position.



This worked well with only a couple of dozen rivets dropped on the floor. With the horns in place the frames were pinned and clamped back-to-back and clocked true to mill the horns out to size (new 12mm end mill bought for this job).

I was pretty disappointed with the milling out of the horns as there was quite a discrepancy between the width of bearing surfaces on each horn, this in spite of my careful measuring. The frames were set on a large slab of flat steel plate (thanks Leigh my back has nearly recovered from lifting it) and all the stretchers screwed in position, this showed up the fact that my workbench is not as flat as I thought.



One minor job was to

shorten thirty-two 4BA

screws to length for the buffer beams using a fairly crude lantern chuck that I had. The boiler is almost finished and my thanks go to those club members who donated time and gas for a big heat for silver soldering (Kevan, Lionel and Geoff, with apologies if I have missed anyone).



















