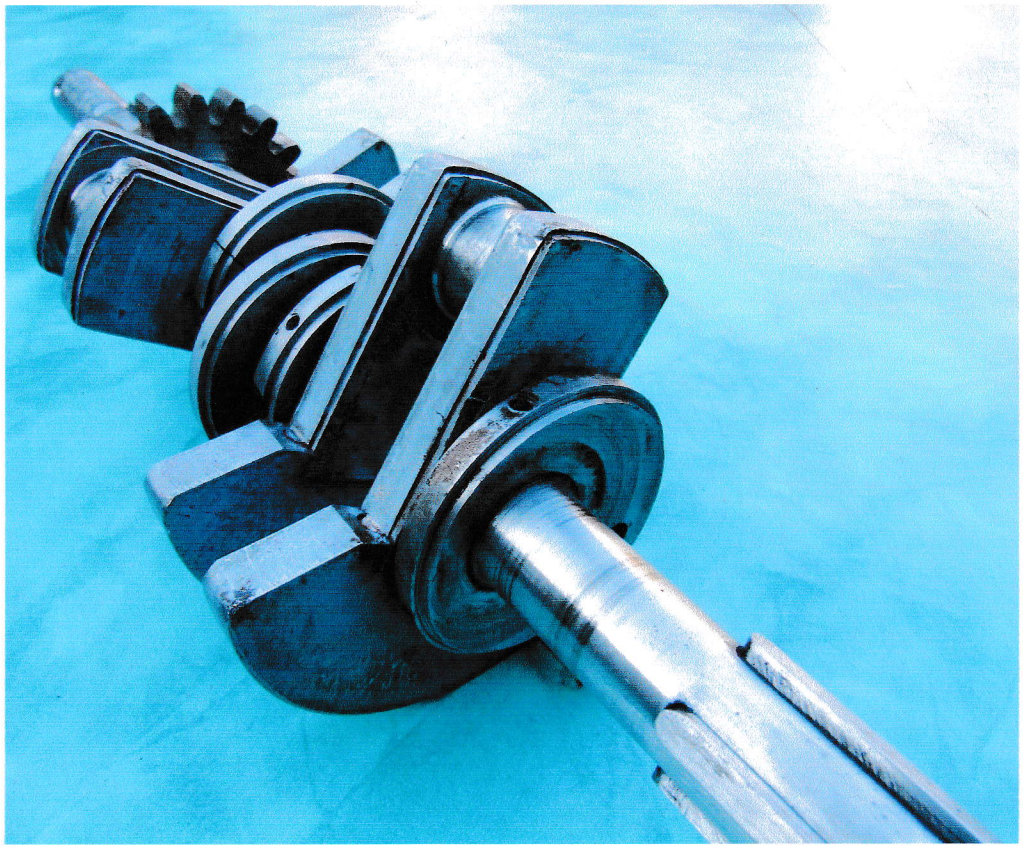
Possibly the biggest improvement pioneered by John Fowler was the introduction of compounding in 1881. All locomotives of the B 6 Lion class were three-speed double-crank compounds, the cranks themselves being set conventionally at ninety degrees to each other. One feature of the full-size arrangement was that the crankshaft itself was a rather compact piece of engineering. Four eccentrics occupied all the available space between the cranks and provided the movement for the Stephenson's valve-gear. In addition a fifth eccentric was located between the H.P. crank and the offside bearing. This created movement for the mechanical water feed pump. Between the L.P. crank and the nearside bearing were the governor belt pulley and the second speed pinion. Outside this bearing, the third (fast) speed pinion slid on splines machined onto the shaft, whilst outside of this was located the flywheel. The latter had to be dished considerably in order to clear the third speed pinion and its mating spur-gear. It was this necessary dishing of the flywheel that gave the Fowler engines their distinctive and instantly recognisable appearance. All of the above has been replicated on the model, resulting in some rather demanding machining operations.

The crankshaft itself was machined from a solid flame-cut steel blank. One of the problems in machining the crankshaft was that as the journals were quite narrow, there was very little clearance for the cutting tool. In producing the finished diameter of each journal, the cut had to be made in both directions, working towards the steps of the webs. This necessitated the use of two cutting tools – one right-handed and one left-handed. Only light cuts were possible due to the narrow section of the cutting tools, the final half-thou being removed by emery cloth.
Before completing the lathe work, the four balance-weights were added to the crankshaft by bolting them to the webs. The final operation was to skim the sides and outer radius of the balance-weights.



The picture (above) shows the crankshaft complete with eccentric sheaves and balance weights. The latter, as on the full-size originals, have been fitted as separate components. All the eccentric sheaves are split in order to facilitate their fitting onto the solid crankshaft.
Splines have been produced by end-milling slots into the crankshaft and afterwards fitting round-ended keys. Those shown in the picture will be host to the slow-speed pinion.

The picture (below) shows the four eccentric-straps and rods for the Stephenson's valve-gear. A generously proportioned oil reservoir is contained within each of the straps. A fifth eccentric will transmit the required movement to the water feed-pump via the curvy shaped drive-rod. The shape of the latter is dictated by it having to duck beneath the second shaft, and connect with the pump-ram to the rear of the spectacle plate. The pump itself is located in the tender and is bolted to the right-hand horn-plate.

