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## **Novelty**

The Novelty was designed by Ericsson, and built by Braithwaite & Ericsson, whose works were situated in London, where Euston Road now is. Braithwaite was later Engineer to the Eastern Counties Railway. Knowledge of the impending Trials seems to have reached the Euston Road rather belatedly, for the engine had to be built within seven weeks. This left no time for trials on the track and only at the eleventh hour, when the engine was delivered to Rainhill, was it discovered that the gauge was wrong, necessitating working through the night to chope the flanges. To his eternal credit, Timothy Hackworth, in person, carried out alterations and repairs on Novelty, which called for skilled attention.

It is of interest that this was not the only mistake which Braithwaite made in connection with gauge, for on the E.C. R he adopted the 5ft gauge, leading to conversion, at much cost, later. His explanation for doing so was that it afforded more space for the boiler. He must have been thinking very far ahead as boilers with an evaporative heating surface of nearly 7,000ft<sup>2</sup>, plus 1,584ft<sup>2</sup> of superheater area, and a barrel diameter of 8ft were subsequently fitted to American locomotives of 4ft 8½ in gauge. The grate area of the Novelty was 1.3/4ft<sup>2</sup>, some of the large American engines had an area of over 120ft<sup>2</sup> – over 60 times as large!

Ericsson went to America, where he achieved fame as – among other things – the designer of ‘Monitor’.

A feature of the Novelty, immediately apparent, is the design of the wheels. The diameter was 4ft 2 in and they were constructed under Theordore Jone’s patent of 1826. In principle they preceded by many years what was to become known as the cycle wheel, in which the weight of the vehicle was hung from the top of the rim, the spokes carrying it being in tension. When the locomotive arrived at Rainhill the wheels were coupled by a chain, but this was removed before the contest as it was considered that local motive had sufficient adhesion as a 0.2.2 and the weight incidental to couple the wheels penalised the entry, as it would have meant a proportionately heavier load. The entrants were certainly power:weight conscious as further evidenced by the omission of the front buffer beam of Rocket.

As Novelty and Perseverance carried their own fuel and water supplies they were the earliest tank engines. This feature led to some difficulty. Plus some acrimony, when it came to assessing the load to be hauled.

The two vertical cylinders, 6 in by 12 in, drove the crank axle, the first time on which such an axle was used on a railway locomotive, though the use of a crankshaft was covered by Joseph Reynold’s patent of 1816 for a steam road-locomotive. Drive, on the Novelty, was through bell-cranks to the axle, an arrangement which enabled springs to be used although the cylinders were vertical. In the case of Sanspareil, where connection of the vertical cylinders to the crankpins was direct, springing would have presented great problems, and - contrary to Stipulation 4 – there is no evidence that it was provided, at least on the driving axle.

The Novelty's boiler had a vertical firebox and a horizontal barrel 10ft long and but 1ft 1in in diameter. The single flue, which returned twice, was 31ft long, and tapered from 4in to 3 in diameter, at the chimney end. The heating surface was 42.5ft<sup>2</sup> of which the firebox contributed about 9.5ft<sup>2</sup> and the grate area about 1.8ft<sup>2</sup>. A very unusual feature was the use of an ashpan pressurised by bellows, which was no doubt essential having regard to the small diameter of the flue. A pressurized ashpan is, in locomotive practice, to be avoided like the plague, for it – as in this case – the draught is derived from a component which is always in motion when the engine is running, it means that the engine can be fitted with safety only when it is stopped, unless an airlock is provided for the firing aperture, which was done on Novelty. As the engine had forced draught, and not induced no chimney was necessary. On the Rainhill track, which involved reversal every 1¼ miles, this most undesirable feature would not have manifested itself – in fact it probably passed unnoticed by most of those present. As the exhaust was not employed to induce draught, it was direct to atmosphere. The boiler was fired from the top, in the same way as much later, Sentinel, Boilers.

A feature of Novelty's boiler was the speed with which steam could be raised from cold; this is reported to have required only 40 minutes on one occasion at the Trials.

In working order the weight as but 3 tons 17cwt, which means that even had the four wheels been coupled the adhesive weight would not have sufficed to pull any appreciable load, assuming that the cylinder-horsepower had been there, but in any case the boiler was much too small for serious work. One of the most vital factors in locomotive design is the provision of sufficient weight to secure adequate adhesion and on that score Novelty was deficient. The engine was not considered to be worth acquiring by the L&MR after the trials, but was used on the St Helens Railway. There in 1833, it was rebuilt with a new boiler and new cylinders. Later it worked on the building of the North Union Railway. A reconstruction of Novelty, incorporating an original cylinder and wheels, is in the South Kensington Science Museum. The wheels were discovered, in 1914, in T.W. Ward's yard at Sheffield.

The Novelty would have ridden better than any other contesting locomotive for it was well sprung and – the drive being through long, almost horizontal connecting rods – the disturbing forces would have been less than those of the other engines. The fact that the cranks were at 90 degrees to each other is not apparent from early illustrations, it could have been the first locomotive to have mechanically packed pistons. Running light at Rainhill, it attained 31 miles/hour, which placed it as the fastest competitor.

That Braithwaite had every confidence in Novelty is apparent from his publicly offering he stake £1,000 that the engine would run from Liverpool to Manchester within an hour. There is no record of anyone taking up his offer – which was as well for him.

Braithwaite and Ericsson after 1830 built only for the American market and employed the Stephenson form. Their contribution to British Locomotive stock was small, being limited to Novelty and its two successors, William IV and Queen Adelaide; all gravitated to the St Helen's Railway. The firm's contribution to locomotive was however out of proportion to their output, for the feature of a vertical cylinder driving through a bell-crank was later used by Sharp, Robert & Co, among other builders.

Novelty, in the view of JGH Warren, 'savoured too much of the old road carriage or fire-engine, on the lines of which it had indeed been designed' He also described some locomotive builders as being 'obsessed by the vertical cylinder of the Novelty'.