

Notes on Mansell Wheelsets

By Richard Salmon - *Bluebell Railway C&W*
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The Mansell wheel, for which he obtained patents in 1848, 1862 and 1866, was designed by R. C. Mansell. Mansell (not to be confused with the later R.E.L. Maunsell of the SECR and SR) was carriage superintendent for the South Eastern Railway at Ashford by 1851, and later works manager for the SER until retirement from the SER in January 1882.

Railway Mechanical Engineering¹, the Carriage section of which was written by S. Warner, C&W Superintendent of the LSWR, provides a specification of the Mansell wheel, that it should be made exactly to the form and dimensions (subject to variations in diameter and journal size between different railway companies) of "Figure 17", which is reproduced here. This shows how the thickness of the tyre (initially 2 1/2") is measured, and that half an inch of the tyre thickness is hidden behind the retaining ring.

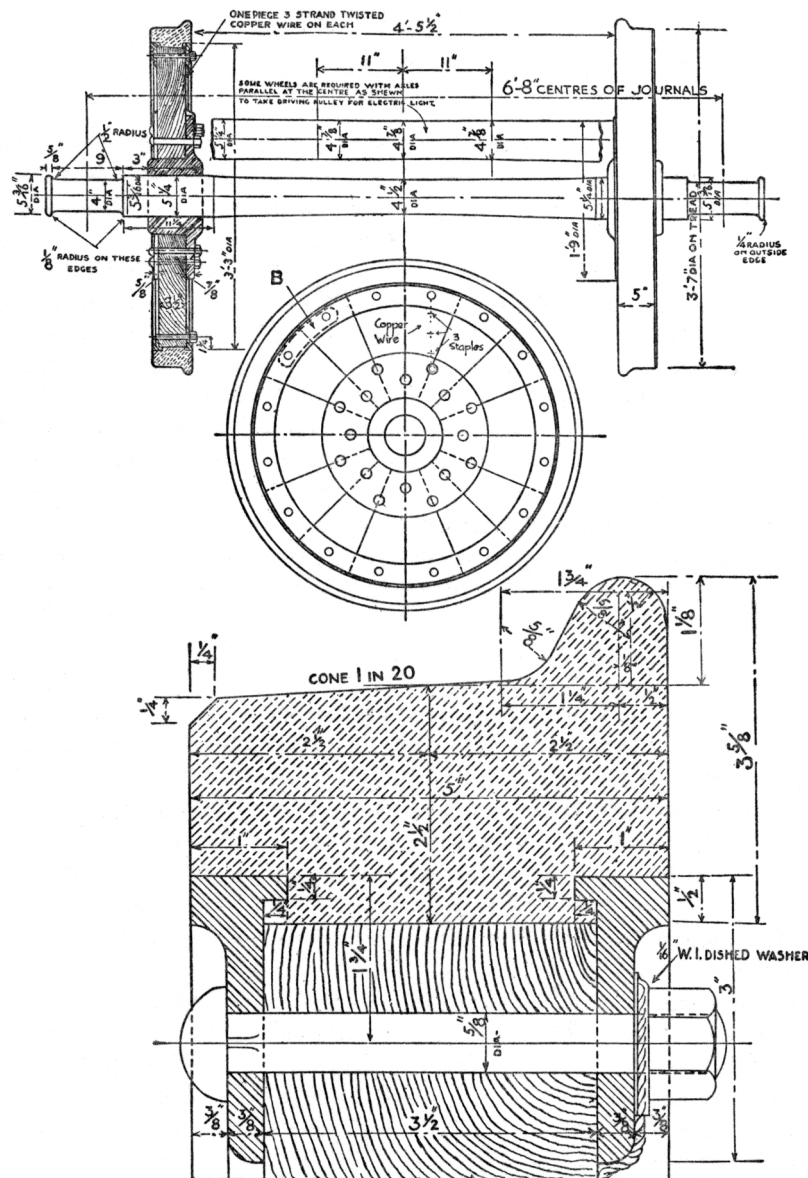


Fig. 17.—Standard Mansell Wood Wheel

The dimensions shown in this figure "practically represents the flange section as acquiesced in by all concerned." (i.e. agreed by the rolling-stock and permanent-way engineers of the English and Scottish lines.)

Warner notes that the nominal diameter of the tread is 3'7" but that it varies from 3' 5" to 3' 7 1/2" between companies. On page 122 he notes: "The tyres are so fastened by lip or retaining ring, that even should a tyre break, no portion can possibly fly off, and practical experience has shown that tyres may be worn down to 1" in thickness with perfect safety before renewing.

This is confirmed by the *Railway Carriage Handbook*² which states on page 139 "It will be seen ... that should the tyre break into several pieces no portion can leave the wheel, while at the same time, the rings prevent lateral movement. Should one ever need to re-tyre a Mansell wheelset, page 141-2 contains allowances for shrinkage onto new and repaired wooden centres, as well as instructions indicating how to undertake the re-tyring.

W. Heaton of the Central Argentine Railway³ indicates (p711) that it was his practice to condemn Mansell tyres when 32mm (1 1/4") thick.

Warner¹ notes (p121) that: "The wheels to be properly bonded with copper wire where shown on the drawing for track circuit signalling, so that the resistance from tyre to tyre shall not exceed .01 ohm. The wheels may also be spot welded in three or more places between the Mansell ring and tyre."

Warner also warns that movement of the wheel on the centre can cause the bolts to cut into the teak segments, and that to prevent this, some companies put a ferrule of malleable cast iron (or cast steel) on some of the boss and retaining ring bolts (driven into the teak).

David Jenkinson⁴ reports (pp 22-24) that "at least two of the NRM's Mansell-wheeled carriages withstood the full rigours of the [then] current BR examination and were cleared for 70 mph running as recently as 1979." He goes on to report numerous advantages of the Mansell wheelset, repeating the safety aspect relating to the security of the tyre even if broken, as outlined above, but also that tyres could be allowed to wear down in thickness to a considerable extent without danger, that the wheels were relatively easy to make and needed little skilled labour, and that the slight elasticity of the wooden centre probably made the wheels less vulnerable to the stresses and shocks caused by passing over rail joints.

References

¹ *Railway Mechanical Engineering*. 1923, The Gresham Publishing Co. Ltd.
This 2-volume "Practical Treatise by Engineering Experts" is based upon the multi-volume work *Modern Railway Working*, published by Greshams in 1912. "The Design and Construction of Carriages and Wagons" (Vol.1 pp.85-260) is by S. Warner, Carriage and Wagon Superintendent, London and South-Western Railway.

² *Railway Carriage & Wagon Handbook*. The Locomotive Publishing Co. Ltd., London. A revised and enlarged edition (dating from around or after 1925) of the *Railway Carriage and Wagon Builders' Pocket Book*, first published in 1907.

³ *The Journal of the Institution of Locomotive Engineers*, Vol.XIII No.62, Sept-Dec 1923. pp633-716 "Carriage Bogie Design", Walter Heaton Mem.Inst.Loco.Eng.

⁴ *British Railway Carriages of the 20th Century, Vol.1*. David Jenkinson, BSc FRSA. 1988, ISBN 0-85059-912-1