

(*Paper No. 2080.*)

“Description of Steel Permanent Way, as used on the
London and North-Western Railway.”

By FRANCIS WILLIAM WEBB, M. Inst. C.E.

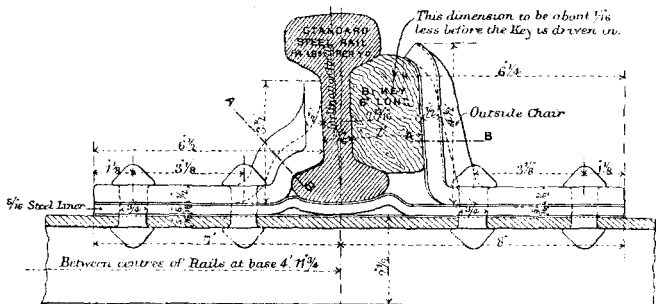
THE accompanying figures show a form of steel or iron permanent way which was designed by the Author as a substitute for the present system of wood sleeper and cast-iron chairs.

The sleepers are by preference of the ordinary trough section, and the chairs are riveted to them.

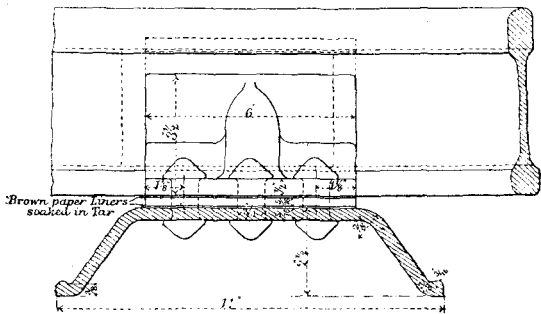
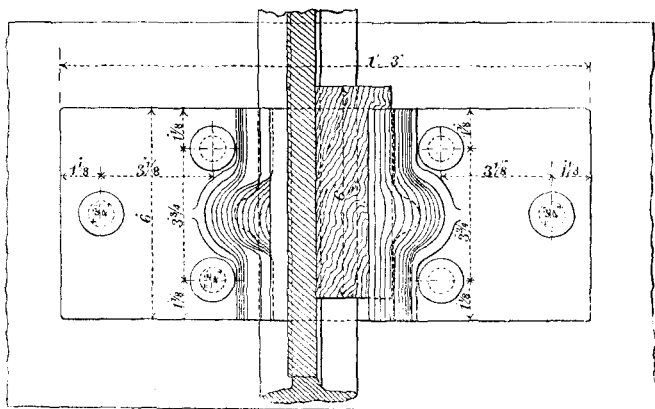
The chairs, which form the chief feature of the design, are made from the cross-ends of steel rails. These are first rolled into flat bars, and then cut and stamped into shape with a bulge in the middle of their width, so as to give strength to the jaws, and also to form a recess into which the wooden key may expand, and so prevent it from working out. It will be noticed that each chair is made of two-angle brackets, and a packing-piece, which serves to keep the rail from injuring the sleeper. Another feature is the placing between the sleeper and the chair pieces of paper paste-board or canvas dipped in tar or asphalt, to keep out moisture and to prevent sliding or working between the chair and the packing, and between the packing and the sleeper.

The system is one that seems to offer the advantages of economy and simplicity of manufacture. In the case of the sleepers, if they are to be generally adopted, to enable them to be produced at the lowest cost, it is advisable as far as possible to introduce one standard form of sleeper, and one standard method of punching. In this way companies, wishing to adopt steel sleepers, might go into the market for them, as they would for a piece of timber for the same purpose, and not have to ask the manufacturers to alter their rolls, or their machinery for punching the holes, for every small order. The matter would be still further simplified if the bottom table of the rail were also made a standard, leaving the engineers to adapt the top table of the rail (which should be of the bull-head section) to their own requirements.

The London and North-Western Railway Company began to experiment with this form of permanent way in May, 1880; there are now on various portions of the line 32,174 sleepers at work ;



NOTE: Chairs stamped out of $\frac{3}{8}$ Steel Plate.



NOTE: Dotted lines for outside Chair.

SECTION OF CHAIRS AT A, B

the first have been down nearly five years, and are showing very well at the present time. One of the advantages of the system is, that it is applicable to the present standard rails and keys without alteration, so that a length of the ordinary wood sleeper road can be taken out and the steel sleepers substituted without any difficulty. With regard to first cost, it compares very favourably with the present system; but if the manufacture is undertaken on a large scale, or under the conditions which have been pointed out, the cost would be still further reduced.

The weight of one sleeper and chairs complete, as used on the London and North-Western Railway is 184 lbs., the weight of the sleeper, 9 feet long, being 136 lbs., and of two chairs and liners, 48 lbs.

The Paper is accompanied by a photograph and a Diagram, from which the illustrations have been prepared.