

labour; it would be unnecessary to flatten the ties on any but the lower side, as the machine would form a perfect seat for both rails. The cores may be from $2\frac{1}{2}$ to 3 feet in length, inserted at the joints of both upper and lower half rails, and secured in their position by a small rivet or pin; they would have the same sectional area as each half rail, and being deeper, they would give fully more strength where the joints occurred than the rail possessed at intermediate points.

A permanent way constructed with a compound rail similar in design to the one now submitted may, when put on its trial, have some inherent defects which we cannot at present discover, but in the absence of a practical test, and in ignorance of any strong objection to the plan proposed, I think it may fairly claim the following advantages:

- 1st. Simplicity of construction and fewness of parts.
- 2nd. Sufficiency of lateral as well as vertical strength at every point.
- 3rd. Could be easily laid in perfect gauge with little skilled labour.
- 4th. The rails would be equivalent to continuous bars of uniform strength, and probably would be found more elastic than solid rails.
- 5th. Great stability, the rails being securely bedded in the ties and their surfaces reduced to the least vertical height practicable above the ballast.
- 6th. The rails would be thoroughly secured from spreading or displacement.
- 7th. The track would be smooth to ride over, free from jolts or jars, and easy on the rolling stock.
- 8th. Economy in cost and maintenance.

Some of these advantages will be readily admitted on a simple inspection of the drawings, others may be inferred from previous explanations, but the last, which is in fact the most important of all, requires some further observations.

Those who have had opportunities of overlooking the operations of the workmen engaged in track repairs must have observed that a great portion of their time is occupied in restoring the injury done to the rail joints, either in removing broken chairs, tightening bolts, or raising the ballast and ties,—indeed at some seasons of the year the most of their time is occupied in raising the joints. With the improved rail