It is evident that the joints of these rails, forming as they do a series of long scarfs, must be very much stronger and better than the common chair joints, but still the joints are not so strong as the body of the rails, since at the points where they occur one half only of the sectional area of the rail is solid. If there had been no other objection to these compound rails than the absence of as much strength at the joints as elsewhere, they would, no doubt, be more generally in use than we find them, inasmuch as in them the weak and defective part of the common rail is very materially remedied. Experience, however, has demonstrated that all these patterns of rails are open to serious objections, the most important of which may be stated as being increased first cost over the common rail, excessive cost of maintenance, and too rapid wearing out.

It is evident that these objections may readily be attributed to the plan of construction, as the application of bolts or rivets throughout the entire length of the rail is indispensable to hold the two halves together. As already explained, bolts cannot be relied on, inasmuch as they constantly shake loose, and in this state the stability of the rail is impaired. It is found, too, that rivets for other reasons are perhaps even more objectionable, and whether bolts or rivets are used it is not long before laminated portions of the upper surface of the rail get in between the two plates, and these acting like small wedges, and driven tight by every passing train, gradually open up the rail and hasten its destruction. It is found, moreover, that unless the bolts are properly performing their duty, the whole weight of trains not unfrequently comes on a single half of the rail, producing violent strains which soon tell on the durability of the several parts. For these reasons such compound rails as have been already tried have not proved economical in maintenance, and in consequence have fallen into disuse.

The design of the compound rail now submitted may be executed of any required weight which a heavy traffic might demand. It is thought, however, that a good serviceable rail may be made weighing 80 lbs. per yard including wrought iron cores, the cores themselves weighing 25 lbs., and each half of the rail 36½ lbs. The ties could be grooved by a machine at a trifling cost, and the grooves for both rails could be cut at the same operation; by this means the proper guage of the track would be permanently secured, and the whole superstructure would be laid with the greatest ease and with very little skilled