WRIGHT'S PATENT

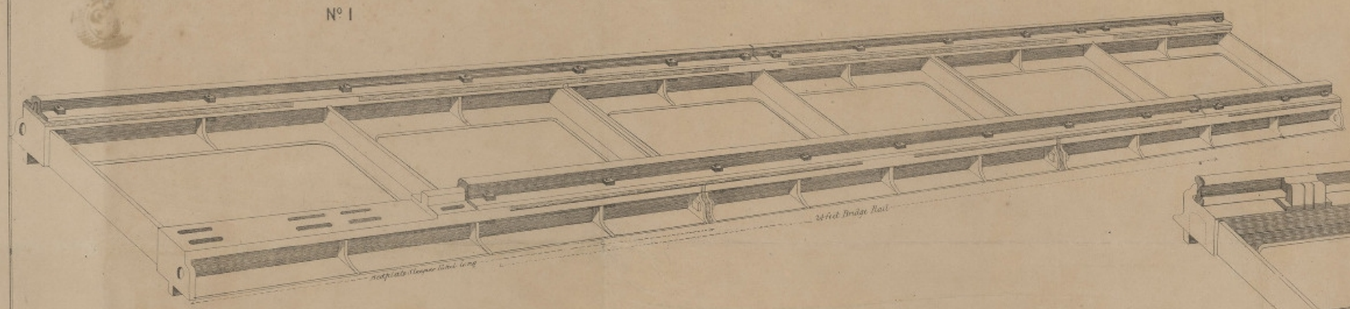
BEDPLATE IRON SOLID SLEEPER PERMANENT WAYS.

LONGITUDINAL SYSTEM.

UPON WHICH 100 MILES PER HOUR MAY BE PERFORMED WITH PERFECT EASE AND SAFETY.

58742
ENGINEERS OFFICE, PADDINGTON

Nº 1



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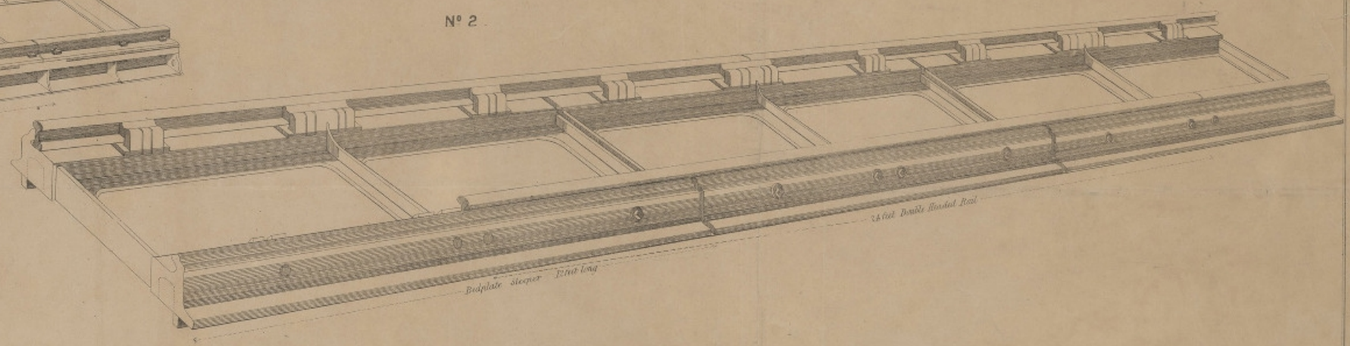
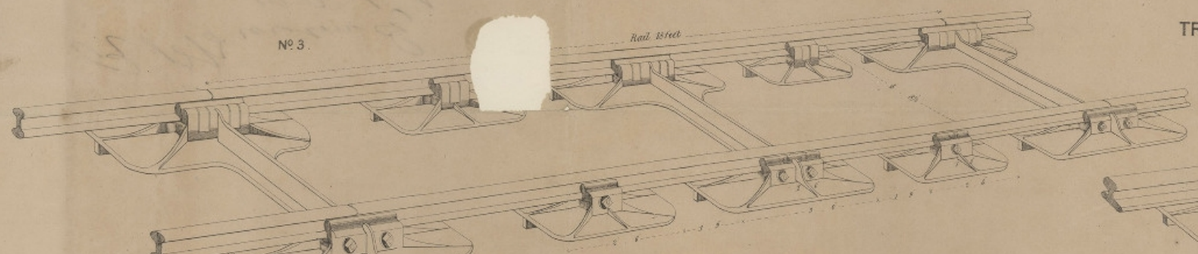


WITH THE DOUBLE HEADED RAIL AND VICE JAW FASTENING.

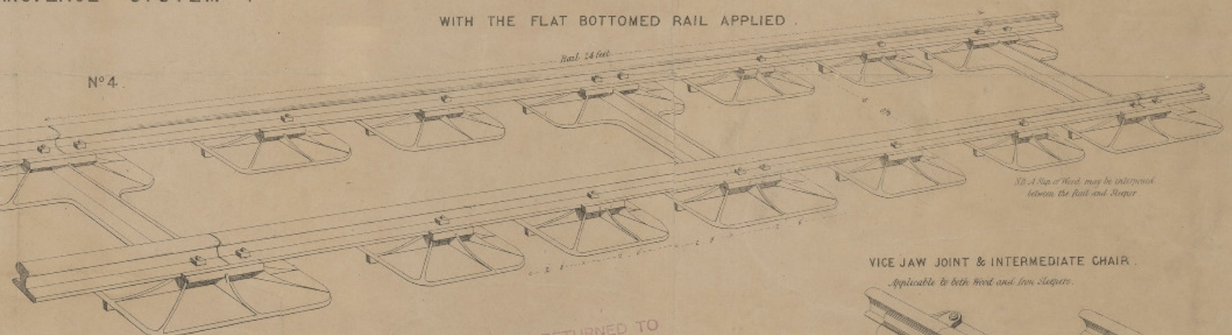
Nº 3.



TRANSVERSE SYSTEM.

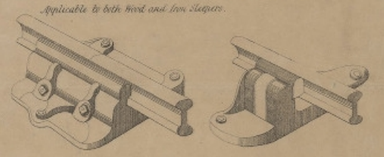
WITH THE FLAT BOTTOMED RAIL APPLIED.

Nº 4.



VICE JAW JOINT & INTERMEDIATE CHAIR.

Applicable to both Wood and Iron Sleepers.



TO BE RETURNED TO
ENGINEER'S PLAN OFFICE
G.W.R. PADDINGTON.

ESTIMATED COST, &c.

The maintenance of the permanent way being one of the heaviest items in the engineering accounts of Railways, it is most desirable to insure the greatest amount of efficiency in its construction, combined with the largest ultimate economy—also simplicity of construction and small liability to derangement, with the greatest strength and usefulness, as well as facility of repair.

No. 1.—Shews the Continuous Bedplate Iron Solid-Sleeper Roadway, with the ordinary Bridge Rail applied. It can be employed alike upon broad and narrow guage railways, is expressly adapted to sustain the highest speed, and heaviest traffic, with the greatest durability and lowest cost for maintenance; having the advantages of the longitudinal and transverse systems combined, also the properties of the wooden with that of the iron road, dispensing with all loose parts, upon which 100 miles per hour may be performed with perfect ease and safety. The most distinguishing feature of this invention is the employment of a single sleeper, as a complete piece of roadway in itself, consisting of one compact and solid mass of iron, capable of sustaining a pair of rails, without any longitudinal or transverse joints, being similarly constructed to the Bed of a Lathe, Planing Machine, or Steam Engine Solid Iron Bedplate. This Sleeper Frame, when combined with others of a similar construction, constitutes the iron way of the railroad, being upon a system of complete and independent framing, incapable of movement among themselves, to which the ordinary bridge rails are effectually secured; but any other shape of rail or chair can alike be attached to these sleepers, and the guage of railway, with the lateral angle of rails and rail joints, are unalterably fixed. A slip of wood is interposed between the rail and sleeper, also between the ends of the sleepers. The combined sleepers, so united, as shown above, become throughout the line, one continuous and immovable mass—and, together with the rail joints alternating, forms on the upper surface, like a lathe bed, a perfect Plane—smooth, stable, and unyielding, resisting the oscillation of the trains, preventing all lateral and vertical motion whatever; and besides having a large bearing surface upon the ballast, as well as a deep lateral resisting surface embedded therein, gives direct and continuous support to the undersides of the rails, while the superincumbent weight of the engine and train is more uniformly distributed and sustained upon the entire bearing surface of the sleepers and rails, thereby attaining undoubted security, permanence, safety, and economy.

But the sleepers may also be used separately without being attached to each other at their ends, as seen at No. 2, with the double-headed rail and vice-jaw fastening; and they are readily applied in the renewal of existing railways, and that which is of the most vital importance, the number of sleepers per mile are reduced, at least three-fourths, as compared to the quantity comprised in ordinary railways, consequently less liable to derangement, besides being an imperishable substructure. For quick curves they are manufactured to the exact radius required, by which a more substantial, safe, and perfect curve than hitherto is attained; and gives the greatest vertical and horizontal resistance to any weight or force which may be exerted to derange its position; and the leverage by which lateral shocks are enabled to exert their force upon the rail, is the smallest hitherto introduced, whilst the supports at the joints of rails are arranged so as to secure the greatest possible strength, and the most uniform surface for the wheels to run upon; but with the application of the rail denominated the Tyre Bar Rail, all vertical leverage whatever is entirely obviated.

There are 440 Longitudinal Detached Iron Sleepers in a mile, and estimating the weight of each at one ton, is 440 tons, which at £5 per ton, and including the fastenings, also deducting old chairs, is £2,445 per mile, single line, without the rails; and notwithstanding this increased cost, is undoubtedly the cheapest for the increasing heavy traffic and hard ridden railways of this country, and always retains an intrinsic value, while the ordinary wooden road, with all its mechanical defects, injury to the rolling stock, and expensive maintenance, is in a few years valueless, and periodically requiring great expense for its ever recurring renewals and relayings, along with its attendant risks and inconveniences; also being composed of numerous small, weak parts, together with short lived wooden sleepers, are again soon knocked in pieces, while the Bedplate Iron Sleepers, being composed of one compact and solid mass of iron, are unlimited in durability, combined with greater economy of maintenance, both of the road and rolling stock, inasmuch as the ordinary wooden sleeper railway is composed of 19,842 separate loose pieces in a mile "unfished," but when fished is thereby increased to 26,000 loose pieces, while the Bedplate Iron Solid Sleeper system contains only 7,000 pieces, being a reduction of 19,000 loose parts as compared with the fished wooden railways—thereby reducing the wear, tear, and shaking loose of the numerous parts, which is the prolific source of the great expense of railway maintenance.

No. 3.—The Bedplate Transverse Solid Sleeper and Vice-Jaw Rail Fastening, with the Double-headed Rail applied is a modification of the Continuous Bedplate Solid Sleeper Iron Roadway, which stretches across the whole width of the way, without any transverse joints, and supports at once the two parallel rails upon one sleeper, securing alike the guage of the line and the tilt of the rail, also the joints of the rails from lateral and vertical motion. Each sleeper is independent, simple, and complete in itself, and being on the transverse system, is as readily applied to the rails of existing railways, as that of common cross sleepers, simply substituting the improved iron for the decayed wooden sleeper, and (as by the action of a vice) the rails are connected to and disconnected from them at pleasure, avoids making holes through the rails, and supersedes wood or iron keys, loose chairs, treenails, spikes, &c., also loose plates, with bolts passing through the rails; and loose Tie Bars are entirely superseded; hence the desired guage of the line, and the tilt of the rail is effectually secured without reference to the skill or care of the workman employed, as loose chairs, keys, and spikes, with their continual supervision, splitting, replacement, cost and hazard, is entirely dispensed with; the rails therefore are not subject to displacement by the blows of the wheels from the loosing of the spikes, chairs, keys, &c. involving great risk of the engine getting off the line, inasmuch as the sleeper being in one compact and solid mass of iron, the relative positions of the rails are unalterable.

No. 3 shows the arrangements of the Transverse Sleepers to a rail 18 feet in length, having in this case a Bedplate Transverse Solid Sleeper at each joint, and one also in the middle of the rail, with two pairs of unconnected intermediates—which Transverse Sleepers and Intermediates are disposed alternately throughout the line, or every other sleeper is an intermediate. The Transverse Sleepers weigh about 8 cwts. and the intermediate about 2½ cwts. each; altogether 26 cwts. to each 18 feet rail, and 381 tons of sleepers per mile, single line.

381 Tons of Sleepers, at £5 per ton		£1,905
12 "	Wrought-Iron Loose Jaws, at £10 per ton	120
17 "	" Dogs, at £15 per ton	255
		£2,280
Credit Old Chairs		130
		£2,150

Per mile, single line, for the iron substructure, but where a pair of intermediates are substituted for the middle Transverse Sleeper, making all the intermediates of the same kind, the weight is reduced to 23 cwts. of sleepers to each 18 feet length, or 337 tons, and including the fastenings, also deducting old chairs, to £1,835 per mile.

The Bedplate Transverse Iron Solid Sleeper, with the Vice-Jaw Rail Fastening, possesses also the facility, and is adapted for being introduced into the road GRADUALLY, in connexion with *Wooden Sleepers*, by being applied in the first place for the Joint Sleepers of existing railways, thereby using up the wooden intermediates, and as decayed sleepers arise, replacing them with iron; hence, by degrees, economically and conveniently transforming the decaying wooden road into durable iron, by which means, without change of system or rails, a complete iron substructure is thus obtained on the line throughout. These Joint Sleepers have a large bearing surface upon the ballast, and a deep lateral resisting surface embedded therein; they also possess weight, firmness, and solidity, being a stable and permanent foundation, not only for supporting the joints of the rails, but also to which the ends of the rails are securely fastened down. The rails also have a large bearing surface upon the sleepers, and the vertical and lateral stiffness, security, and support, imparted by the strength and steadiness of the Vice-Jaw Fastening, not only increases the durability of the wearing surface of the rail, but also prevents it from hammering and notching upon its seating, preserving the lower head of the rail from indentation and injury while the upper one is in use; and the operation of turning the rails is performed as easily as when the common description of chair is used, and trains may pass over them immediately the rail is laid in, while all concussion and noise is also prevented.

The Bed-plate Transverse Sleeper, with the Vice-Jaw Rail Fastening, is also advantageously applied to existing railways simply for the Joint Sleepers alone, and retaining the intermediates of wood, by which not only are the rail-joints supported and secured, without the use of loose chairs, pins, and keys, or the necessity for fishing, or the evils of punching holes through the rails, but embracing the two parallel rails upon one solid piece of iron, the guage of the line and tilt of the rail are thereby alike rigorously preserved; and as no lateral movement of the sleepers is possible, and the relative positions of the rails are also unalterable, and perfectly secure against casualties—therefore derangement from any kind of strain or concussion is impossible, and from their much greater simplicity they are readily applied to the rails of ordinary railways.

Defective or worn out rails can be removed and replaced with the greatest facility, without disturbing the sleeper or ballast, as the only wear to be repaired in the Bed-plate Sleeper Permanent Ways is that simply of the upper surface of the rail, and to which there is the easiest access, that is also the principal item of repair, and therefore a really permanent way and enduring structure is attained, and as easy in riding over as the wooden road.

No. 4.—Shows the Bedplate Transverse Iron Solid Sleeper, with the Flat-Bottomed Rail applied, also suited to the ordinary Bridge Rail, and can be employed alike upon narrow and broad-guage railways, stretches across the whole width of the way, without any transverse joints supports and embraces at once a pair of rails upon one thoroughly permanent sleeper, in one piece; securing alike the guage of the line and the tilt of the rails, also the joints of the rails from lateral and vertical motion.

The ever decaying wooden sleepers, loose chairs, wood keys, spikes, and fish jointing, with their innumerable small, weak parts, are entirely superseded, and the rails are secured directly to the sleepers without any intervening loose chairs, by which a great source of danger and expense, arising from their use is avoided. The railshave a large bearing surface upon the sleepers, and the sleepers also upon the ballast, as well as a deep lateral resisting surface embedded therein; and being in one compact and solid mass of iron, is much more simple, durable, and economical than the perishable wooden sleepers, with their loose chairs and appendages now employed, being only one main piece, instead of the usual troublesome combination of numerous small, weak, and separate parts. Moreover, loose tie bars and cotters are dispensed with, consequently greater simplicity and security are obtained.

Weight of Transverse Joint Sleeper, 4 cwts.; Weight of Intermediate, 1 cwt.

Sleepers, per mile, 2,200 = 176 Tons at £5 per Ton	£880	0 0
Bolts, " 7,040 = 4 " £18 "	72	0 0
Rails, 70lbs. per yard, = 110 " 7 "	770	0 0
Cost per mile, single line	£1722	0 0

It is therefore produced as cheaply as an ordinary wooden sleeper railway, and has the properties of the wooden, in combination with the iron road, besides insuring the greatest amount of efficiency in its construction, and the largest ultimate economy, with the greatest strength and usefulness, as well as facility of repair—for the rail-fastenings are all in sight, simple, and readily got at. By this means, defective or worn out rails are removed and replaced with the greatest facility, without disturbing the sleepers or ballast; each sleeper also, is simple, independent and complete in itself, therefore quickly laid down or replaced when required, and suited to any kind of ballast. They are made of various sizes, weights and proportions, in order to suit light or heavy traffic railways, as may be required.

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